



Pedagogic Relevance of Integrating Augmented Reality in Saudi English Classrooms: A Systematic Review

Assem Alqarni ^{a*}

^a King Abdulaziz University, Jeddah, Saudi Arabia.

Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Every day is a new experience as technology in general has become an integral part of every aspect of modern life. Today, the learning environment plays an important role in influencing learning outcomes, especially after the Covid-19 pandemic. Researchers and educators have begun to discuss and test the implications of these realities for education. Currently, researchers are busy exploring pedagogic relevance of two environments: virtual and augmented reality. The field of English language learning is no exception. The author of this study intended to study importance and impact of augmented reality (AR) in learning English. Teachers' perceptions and digital skills regarding the use of AR were also investigated. Twenty (20) related studies were reviewed for this study. Selection of the articles was made according to the objectives of the study. Latest studies were mainly included, however, quite a few old studies were considered due to utmost importance. The Findings of this study are in accordance with most of the papers considered for the systematic review which indicate that the use of AR applications can be effective if appropriately employed. Teachers' perceptions of AR were found to lead to the conclusion that it improves achievement and increases student motivation and interest. However, the teachers were not very familiar with the AR environment. These findings have implications for learners, teachers, curriculum designers, and administrators seeking to integrate AR into English language teaching and learning.

*Corresponding author: Email: amalqarni1@kau.edu.sa;

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1. INTRODUCTION

Technology has become an impact and influential part of education and industry. Students around the world have access to sophisticated and modern devices such as smartphones and tablets. This allows the 21st century learners allow them to overcome time and geographical barriers [1]. These devices can also be used for entertainment, such as playing games, watching videos or listening to podcasts, without time or location restrictions. However, English teachers often face challenges related to engaging students in classrooms [2,3]. Technology in general and digital media in particular is developing rapidly and offers new ways to make language learning more effective. Augmented Reality (AR) can be operationally defined as a technology that can be integrated with gaming and teach English in general. AR can create an immersive and interactive learning environment that integrates virtual objects with the physical world. Hence, it is important that a teacher is well prepared to integrate AR. While they investigated the effect of AR, gamification content with mobiles for language-integrated learning, authors [4,5] advocated the use of AR. Various studies and reviews have explored the other side of the reality saying that there aren't enough experimental studies showing the role of using mobile-learning approach to enhance language learning [6]. AR technique enables learning through 'learner-centered' learning approach, which can have a positive impact on the development of students' competence and autonomy [7].

2. LITERATURE REVIEW

Many authors have unanimously agreed that AR environment is a blend of physical and computer generated(virtual) context. [8,9,10]. AR generally intends to provide learners with spatial experiences, which can be thought of as a tool that integrates a virtual content, however it looks real. In an optimal manner, the use of AR allows students to view both physical and natural environments. Learners can utilize AR to access normally inaccessible content [11,12]. AR has been implemented in multiple pedagogic situations, including art as studied by [13]. Similarly, use of AR and its benefits in astronomy [14] and science education [15] were investigated. The context of other subjects such

as medicine was explored by [16], biology by [17]. Studies have indicated that AR has a potential of arousing positive emotions, facilitate interaction, and provide valuable learning opportunities. AR can be used to teach all the skills and elements of English language.

AR in Education: AR combines the real world and virtual elements, such as audios, videos, images, text, 3D models and many similar things. This technology allows users to interact, immerse themselves in both the physical and digital worlds. It has been utilized in various fields, including gaming, education, healthcare, and many others. According to [18], numerous large corporations and organizations have embraced AR for training and visualization purposes. Development of the interactive textbooks is one of the examples. Author [19] discovered that AR has been applied in diverse areas such as tourism, social interaction, communication, commerce, and education. Another researcher [20] attempted to study AR's pedagogic contribution to the learning of vocabulary. Ogawa [21] assessed the use of Aurasma, an AR platform, in enhancing vocabulary and retention power among second-grade EFL students. The findings indicated that AR had a beneficial influence on reading and overall comprehension. Taskiran [22] explored the consequences of AR on students' encounters in Turkey and explored the benefits of the game-based approach. AR has the potential to develop proper attitude of the learners towards learning, and provide an authentic learning experience [23].

AR in Education and Language Teaching: The utilization of AR is said to be quite effective in quality improvement of online education. Authors [24] state that technology integration enhances educational experiences, and certainly boost student's achievement which we can never expect during traditional teaching. It has been contented [25,26] that the implementation of AR has greatly contributed to the practice of e-learning, interactive learning process and performance of the learners [27]. The immersive learning; combination of digital and physical environment, is expected to facilitate critical thinking and problem-solving which is one of the major curricular aims in these days [28]. In recent past, especially after the pandemic covid-19, many studies advocated the integration of AR in

educational settings that eventually boosts learners' experience and ultimate learning. [29,30]. Researchers investigated benefits of learning environment especially during the COVID-19 pandemic, and they eventually defended AR [31-33].

AR in Reading Comprehension: Many researchers have shared their ideas about the comprehension, but Radvansky [34] describes comprehension as one of the abilities to construct and maintain coherence. EFL learners may face several challenges in reading comprehension including difficult words, their contextual meanings. Research has shown that there is a close connection between mental visualization and comprehension of the reading texts. [35].

AR technology motivates the learners due to which they start enjoying the learning process. It reduces students' anxiety to a great extent while 'reading' therefore, 'process of word learning' is appropriately enhanced [36].

Digital tools and devices can aid readers. E-books or audio-books are usually utilized in classrooms for mind mapping. Similar apps can be utilized in the context of education or learning as they are supposed to facilitate learners. Gadgets like tablets, cell phones, or PCs also facilitate readers in many ways. [37]. It has already been proved that AR apps have suitably supported readers and learners. [38]. In addition, Augmented reality (AR) offers an option to experience information gathering in a new way rather than reading a traditional text reading [39]. While [40] Kun-Hung Cheng investigated students' mental burden, inspiration, and perspectives involving AR innovation in understanding exercises. Lin [41] investigated how children's reading abilities were affected by augmented reality. Majority of children were captivated by the visual aspect. The children's participation in the reading activity was evident in qualitative observations. The scientists suggested the grown-ups' help for youngsters' AR story perusing as it assumed a significant part in furnishing them with investigation encounters.

Researcher [42] concluded that the exploratory gathering understudies experienced fulfillment with their support in intelligent perusing exercises in light of AR and further developed their perusing understanding level. The qualitative findings showed that augmented reality (AR)

applications could be useful educational tools. Besides, the SC-AR Model (Platform Expanded Reality) successfully further developed students' understanding [43].

Wang [44,45] studied if the innovative AR can be well integrated into an online learning. These studies investigated the effects of reducing face-to-face teaching/learning practices, and increasing the use of AR, and the results were positively related.

Vocabulary Learning: Vocabulary is the most essential element of any language. Without knowing a word (its sound, meaning in context, spelling, grammar, etc), learning is not complete [46]. In a Saudi EFL setting, jargon is thought of quite significant as closely related to vocabulary and culture. Sms through Mobile applications, micro-blogging, in addition to 'interpersonal organizations' offers new opportunities for EFL learning. [47] The utilization of AR in vocabulary has been investigated by a few researches [48-50]. Students' motivation has been found to be positively correlated with AR technology. A few researchers have investigated the effect of AR on learning vocabulary [51-53].

3. THE PRESENT STUDY

The study is a systematic review that focuses on those studies which are closely related to the present study (Pedagogic Relevance of Integrating Augmented Reality in Saudi English Classrooms: A Systematic Review.

Systematic review details can be seen in Appendix A.

Research Questions

- 1 How significant is AR in learning English?
- 2-Which aspect of English is more easily learned through AR environment?
- 3 -To what extent are English teachers aware of AR, and integrate in their classes?

Tool of Data Collection: Systematic reviews of 20 related studies were done. Details can be seen in Appendix A.

Analysis: Analysis of related studies (related to each research question) has been done, and conclusions were accordingly made.

4. RESULTS AND DISCUSSION

Results

Research question-

1. How significant is AR in learning English?

The findings of the review of the studies (included in the systematic review of this study) suggest that AR is highly crucial in exerting a positive effect on the learners of English. AR facilitates learners in many ways especially by creating an interactive environment for learning and motivating the learners to take active part in learning of English.

Research question-

2. Which aspect of English is more easily learned through AR environment?

AR is significant for all the skills and elements of English language, however Vocabulary learning and reading skills are the two most benefitted area/skill.

Research question-

3. To what extent are English teachers aware of AR, and integrate in their classes?

It has been noted that many teachers are not aware of the term AR, but the teachers use technology and media in the teaching/learning of English. Though this is a modern digital era in which everyone uses some technology for communication, hence it is important to mention that not all teachers are ready to utilize novel and innovative concepts and applications by integrating modern technologies in English classrooms for better outcomes. If this is the case such teachers need to be professionally develop so they utilize available technology.

Discussion: Literature review suggests that the utilization of AR offers valuable opportunity to facilitate EFL learning. In other words, AR yields better language learning outcomes. In this review, the findings demonstrate the benefits of AR in EFL learning is an example of innovation and modernization of language learning. Students can effectively develop their ability to visualize and communicate through the use of augmented reality technology. This outcome focuses what was found in past examinations with respect with the impact of intuitive learning

assignments on fostering understudies' language abilities [54-58]. Additionally, teachers' positive perceptions of the significance of using augmented reality confirmed that AR contributes positively towards effectiveness of English lessons and achievement of learning objectives.

They emphasized that AR encourages language practice in students. Moreover, educators upheld the possibility that AR fosters English language abilities. Similar studies were carried out in the past which revealed favourable insights among EFL educators and pedagogues towards utilizing AR. Besides, AR interaction helps EFL learners to be independent, finish the task on time, pick English exercises they can do all alone, know about their mix-ups and right them, diminish their dependence on instructors' direction, utilize the web and PCs to study and work on their English and simply decide and define objectives for their learning.

5. CONCLUSION AND RECOMMENDATIONS

The study shows that AR helps EFL students improve their learning ability. Furthermore, it shows that teachers, educators researchers see the utilization of AR as important, inspiring, and useful as it enhances language abilities and encourages independent learning. According to the findings of the study, many teachers are not aware of AR so they need to attend professional development programs to refresh their existing knowledge. Professional development sessions can be organized by institutions. Extra preparation could give instructors more certainty and further ensures that they are utilizing AR reality. AR innovative evaluation may likewise empower educators to go with informed choices on its utilization in learning process.

Main aim of this study was to explore the impact of involving AR in EFL classrooms. Additionally, the study examined teachers' awareness, and attitude toward augmented reality. They were not much aware, but they were found using some techniques which were quite similar to AR.

The findings uncovered that involving AR in classrooms enhanced EFL students' achievements. As an outcome of this study, course-book writers are encouraged to utilise AR reality environment to enable students to connect with the content. Researchers, pedagogues and educators are additionally encouraged to utilize AR in their texts and learning materials to

facilitate the learners to acquire both subject and language skills.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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APPENDIX

Appendix-A. List of reviewed article

Author(s)	Objectives	Major findings
Mohammad Wedyan et al. [59].	To study the concept of the state of art and AR based English Language Learning	AR enhances language skills and improves academic achievements. It relaxes students, develops creativity among learners, and boosts interaction
Cipresso et al. [60].	To investigate about importance of Virtual and AR Research	AR creates interactive environment by motivating the learners.
Ebadi & Ashrafabadi [61].	To explore an impact of AR on Reading comprehension.	Students were satisfied with the use of AR.
Fernandes et al. [62]	To explore the importance of an Educational Game to Teach Children ...	The proposed game improved children's knowledge.
Elmqaddem [63]	To study the future prospects of Augmented and virtual reality	AR and VR offers new teaching and learning models.
Lee [64]	To see the effects of AR and a printed game on student ...	game-based learning engages learners more to learn better.
Chang et al [29].	To study ways of enhancement of English-Learning Performance Using AR	The learning performance was found 'enhanced' and the feedback of using AR is positive. Students can focus more on the practice of speaking, and their confidence was boosted.
Tulgar et al. [65]	to explore the current trend of research on AR in teaching English	Results indicated that related studies were mostly related to mobile learning and gamification.
Taskiran [22].	To research into the impact of AR games on motivation.	AR-based activities increase attention and reinforce motivation through M-learning.
Punar [66]	to review studies available in SSCI/ESCI/ERIC indexed papers of language education	The findings indicated that vocabulary learning was emphasized more than other aspects.
Che Dalim [67].	to study the use of AR with speech input...	By creating an innovative teaching strategy using modern technologies there can be an increase in knowledge that feels better when compared with traditional strategy.
Hu et al [68].	to analyze the application of AR game in learning English.	AR can be effective in teaching English pronunciation.
Xu [69]	To propose an AR-based case study of EFL teaching resource .	AR enhances students' interest in English learning which leads to better outcomes.
Alharbi [70]	To see the Affordances and impact of AR for ESP	AR technology can yield better results in achieving proficiency in vocabulary.
Simonova [71].	To find out the contribution of AR in TEFL	AR is an effective way for teaching a foreign language at tertiary level.
Sabbah [72]	To explore the connection between AR-based Learning	There is a positive effect of AR on all dimensions of motivation.

Author(s)	Objectives	Major findings
Caetano [73]	and Motivation... to explore the effect of ARLang on Portuguese Vocabulary Learning	Virtual labels were preferred by the learners over learning with flashcards.
Rasalingam et al. [74]	to elicit the effect of the Application of AR Technology in Early Childhood Classroom in Malaysia	The use of Augmented Reality (AR) has the potential to enhance the traditional learning method.
Sinha [75]	To study the relevance of AR as an Interactive Learning Environment	AR can help instructors to create an interactive setting in which learners can yield better outcomes.
Yulian et al. [76]	To evolve and develop AR as Assisted Technology ...	Students who used AR application performed better than those who studied through the traditional method.
Tripathy and Panda [77]	To explore the adaptability and awareness of AR in Teacher Education	This study explored that the teacher training institutions were equipped with necessary resources, however staff was not fully aware of technology like AR reality.
Oueida et al. [78]	to find out AR Awareness and Applications in Education	The study revealed that there is a need to enhance AR before its utilization for better results.

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