# Alman Dili ve Kültürü Araştırmaları Dergisi

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## A Review of Augmented Reality-Supported Studies in Foreign Language Teaching

### Yabancı Dil Öğretiminde Artırılmış Gerçeklik Destekli Çalışmaların İncelenmesi

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#### Abstract

This study explores papers investigating augmented reality (AR) integration in foreign language teaching and learning. Most of the reviewed articles examine AR technologies' effects on learners' motivation, engagement, and academic achievement. With the increasing presence of technology in educational settings, AR offers new opportunities for immersive and experiential learning. This research explores how AR-supported tools are used in foreign language education by examining studies indexed in the Web of Science, SCOPUS, and ERIC databases, which have received a certain number of citations. Employing a qualitative document analysis, this study performs a literature review to identify recurring themes and outcomes. The findings reveal that AR creates a multilingual and multicultural environment, allowing learners to actively experience the foreign language and its cultural context, aligning with the "Action-Oriented Approach" of the Common European Framework of Reference for Languages (CEFR). Notably, most studies in foreign language teaching assisted with AR-based technologies focus on English as a foreign language. This research highlights the potential of AR in foreign language learning. It suggests further research and implementation in areas such as the teaching of German and French as foreign languages to develop innovative and cost-effective solutions to maximize the benefits of AR across various educational contexts.

*Keywords:* Augmented Reality (AR), Virtual Reality (VR), Digital Games, Foreign Language Teaching/Learning

#### Öz

Bu çalışmada, artırılmış gerçekliğin (AG) yabancı dil öğretimine ve öğrenimine entegre edilmesini araştıran makaleler incelenmiştir. İncelenen makaleler çoğunlukla AG teknolojilerinin öğrenenlerin motivasyonu, katılımı ve akademik başarısı üzerindeki etkisini araştırmaktadır. Teknolojinin eğitim ortamlarında giderek daha fazla yer edinmesiyle birlikte, AG sürükleyici ve deneyimsel öğrenme için yeni olanaklar sunmaktadır. Bu araştırma, yabancı dil eğitimi alanında AG destekli araçların nasıl kullanıldığını anlamak amacıyla Web

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of Science, SCOPUS ve ERIC veritabanlarında dizinlenen ve belli sayıda atıf almış çalışmaları incelemektedir. Nitel doküman analizi yöntemiyle yürütülen bu çalışma, sınıf katılımının artması, dil öğreniminin hızlanması ve kültürel farkındalığın gelişmesi gibi tekrar eden tema ve sonuçları belirlemek üzere bir literatür taraması yapmaktadır. Bulgular, AG'in çok dilli ve çok kültürlü bir ortam yaratarak öğrenenlerin yabancı dili ve kültürel bağlamını aktif bir şekilde deneyimlediğini ve bu yönüyle Diller İçin Avrupa Ortak Başvuru Metni (DOBM)'nde belirtilen "Eylem Odaklı Yaklaşım"a uygun olduğunu ortaya koymaktadır. Yabancı dil öğretimi alanında yürütülen çalışmaların büyük çoğunluğunun İngilizcenin yabancı dil olarak öğretimi alanında gerçekleştirildiği dikkat çekilmektedir. Bu araştırma, AG'in yabancı dil öğrenimindeki potansiyelini vurgulamakta ve AG'in faydalarını çeşitli eğitim bağlamlarında en üst düzeye çıkarmak için geliştirilebilir ve uygun maliyetli çözümlerin oluşturulmasına yönelik, özellikle Almancanın ve Fransızcanın yabancı dil olarak öğretimi gibi alanlarda daha fazla araştırma ve uygulama yapılmasını önermektedir.

***Anahtar sözcükler:*** Artırılmış Gerçeklik, Sanal Gerçeklik, Dijital Oyunlar, Yabancı Dil Öğretimi/Öğrenimi

## Introduction

In the era of constant transformation we live in, the evolution and advancement of technology are regarded as part of a natural process. It can be observed that today's youth and children are born and raised surrounded by engaging technology and digital games. For this reason, experts make a noticeable effort to incorporate technology and games into educational settings, and research has increasingly focused on computer-aided or technology-supported education. Numerous information and communication technologies have evolved in this context. Web 2.0 tools have been developed, and virtual reality, augmented reality (AR), and artificial intelligence (AI) programs have emerged. According to research, augmented reality studies have significantly increased, particularly since 2010 (Cai et al., 2021; Garzón et al., 2019; Özdemir et al., 2018).

AR, which is used in a wide range of fields such as engineering, medicine, art, biology, architecture, sports events, and tourism, has also begun to be employed in foreign language teaching (Marrahí-Gómez & Medina, 2022; Parmaxi & Demetriou, 2020). Studies on AR have highlighted aspects such as motivation, class participation, collaboration, and accelerated learning (Akçayır & Akçayır, 2017; Parmaxi & Demetriou, 2020).

In some cases, teaching the culture associated with the "foreign" community may be neglected in foreign language teaching (Tseng, 2002, p. 11). However, it is now recognized that language and culture are inseparable. As a natural outcome of recent language teaching theories and approaches, the Council of Europe has established the "Common European Framework of Reference for Languages: Learning, Teaching, Assessment" (CEFR), outlining the objectives of European language policies through the themes of multilingualism and multiculturalism (Council of Europe, 2001). According to the specified text, an "Action-Oriented Approach" has been adopted in foreign language education; the learner is encouraged to actively participate in a process based on experiential learning within the learning environment. Digital games that actively incorporate the use of foreign languages, along with the subsequent emergence of AR, enable the learner to enter a multilingual and multicultural environment and actively engage in the experiential learning process.

As the influence of technology in education continues to expand, augmented reality (AR) holds promising potential in enriching foreign language teaching by merging linguistic and cultural elements within immersive, interactive environments. By aligning with the Common European Framework of Reference for Languages (CEFR) principles, AR provides a platform where learners can engage with the language in context, promoting linguistic competence and intercultural awareness. Through an action-oriented and experiential learning model, AR encourages learners to actively participate and build practical

communication skills in multilingual and multicultural contexts, thus bridging the gap between language and culture in modern foreign language education.

## Method

This study aims to examine research on Augmented Reality (AR) in foreign language teaching/learning and discuss how these studies contribute to the literature from various perspectives. To this end, AR and foreign language teaching papers indexed in the Web of Science, SCOPUS, and ERIC databases were analyzed in this research.

The qualitative analysis method employed in the study is described by Creswell as follows:

"Qualitative research begins with assumptions, a worldview, the possible use of a theoretical lens, and the study of research problems inquiring into the meaning individuals or groups ascribe to a social or human problem. To study this problem, qualitative researchers use an emerging qualitative approach to inquiry, the collection of data in a natural setting sensitive to the people and places under study and data analysis that is inductive and establishes patterns or themes […]" (Creswell, 2007, p. 37).

For analyzing the data, this research employs document analysis, which "involves skimming (superficial examination), reading (thorough examination), and interpretation." (Bowen, 2009, p. 32)

## The Emergence of Augmented Reality

Although the earliest known reference to "Augmented Reality" dates back to 1901 when Frank L. Baum introduced the term "character marker," the widespread use of this term only emerged in the 1990s, spurred by advancements in technology and the advent of mobile phones (Marrahí-Gómez & Medina, 2022, p. 7). Owing to its initial fame to Pokémon and requiring significant costs at the time, AR was initially used almost exclusively by Air Force pilots for training purposes. However, those wishing to use AR no longer required such expensive equipment, as AR-supported applications eventually became accessible even through mobile phones (Akçayır & Akçayır, 2017).

The origins of augmented reality (AR), as we currently understand it, trace back to Sutherland's pioneering study in the 1960s, where he employed a transparent head-mounted display (HMD) to display 3D graphics. Nevertheless, sufficient research emerged in the late 1990s to formally establish AR as a distinct academic field. In 1997, Azuma released a comprehensive survey that outlined the field, identified key challenges, and recapped the advancements up to that time. Since then, AR has seen impressive expansion and progress. By the late 1990s, numerous AR-focused conferences began to take shape, including the International Workshop and Symposium on Augmented Reality, the International Symposium on Mixed Reality, and the Designing Augmented Reality Environments workshop (Azuma et al., 2001).

AR technology has enabled educators and learners to engage in digital and interactive classrooms, blending the real-world environment with augmented digital elements. Various factors, such as the availability of free applications like Roar, Zapworks, Aumentaty, etc., have driven the widespread adoption of AR tools. The rapid growth of AR has been so successful that numerous global companies have incorporated it into their portfolios of apps and games. For example, IKEA developed an app that allows users to visualize its products in their own homes for improved representation, while Nintendo launched Pokémon Go in 2016, which has become the most popular game globally, using AR as its primary gameplay feature (Marrahí-Gómez & Medina, 2022).

Carmigniani and Furht defined the AR term as "a real-time direct or indirect view of a real-world physical environment that has been enhanced/augmented by adding virtual computer-generated information to it. AR is interactive and registered in 3D and combines real and virtual objects" (2011, p. 1). Augmented reality (AR) can be described as a technology that integrates digital objects or enhanced elements into the physical world. An AR system has the following attributes: physical and digital objects are integrated within a real-world setting, it is operated interactively and in real-time, and natural and virtual objects are synchronized with one another. Augmented Reality (AR) differs from Virtual Reality (VR) in that VR immerses users in a completely virtual environment created by a computer. In contrast, AR enhances the real-world environment by overlaying additional information and images through the system (Karagözlü, 2018).

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Numerous studies indicated that AR technologies positively support learners' cognitive learning processes, academic achievements, and motivation (Chang et al., 2014; Liou et al., 2016; Sotiriou & Bogner, 2008). When examining the games students play outside of school, it can be noted that they tend to prefer collaborative and multiplayer games in addition to single-player games (Dunleavy et al., 2009).

> "Massively multiplayer online games (MMOG), such as the World of Warcraft (Blizzard Entertainment) and Everquest (Sony Online Entertainment), bring players together online where they can interact in a virtual, immersive, collaborative context." (Dunleavy et al., 2009, p. 8).

It is inevitable that these students from many different societies and cultures, who come together through digital games and AR, will communicate verbally or in writing and use foreign languages in international settings. With AR-based technologies, students can engage in simulated conversations; for example, they might chat about French cuisine with virtual French speakers as if they were in an authentic French restaurant, interact in English as if they were at Heathrow Airport in the UK, or chat with their German friend while eating a Berliner as if they were in Cologne. In this way, AR applications allow students to improve their foreign language speaking and listening skills within relevant contexts. A key benefit of AR in education is its ability to foster an integrated, blended learning setting that supports the growth of critical thinking, problem-solving, and collaborative communication skills by merging digital and physical elements within a shared space (Dunleavy et al., 2009; Özdemir et al., 2018).

AR and digital games can incorporate cultural aspects by superimposing culturally significant content (like regional cuisine, traditions, or iconic landmarks) onto the user's surroundings. This enables learners to deepen their comprehension of the culture tied to the language. Additionally, augmented reality enriches foreign language learning environments and often shifts students, who typically remain passive in such settings, into an active role (Taşkıran et al., 2015). This outcome is also one of the desired results in foreign language teaching according to the CEFR's action-oriented approach.

Employing AR technologies in foreign language education will allow students to realize how words are applied within specific contexts and phrases (Taşkıran et al., 2015). In this way, students will observe which words can be used in which sentences and will experience where to place those words within a sentence according to the syntax and grammatical rules of the foreign language.

In a study conducted in Turkey on the use of AR technologies in foreign language teaching, students highlighted the advantages of AR, noting its delightful, motivating, learning-facilitating, and memory-enhancing features. The same study's results indicated that, according to students, the use of AR in foreign

language teaching also brings certain disadvantages: some students viewed AR as a time-consuming tool, while others pointed out technical or usability challenges. However, some participants reported no disadvantages in using AR (Taşkıran et al., 2015).

In a study in Japan, the research group implementing an AR tool in a foreign language classroom indicated experiencing specific issues related to technology and user experience with the AR application (Yang & Mei, 2018).

## Findings

The data selected by the researcher was drawn from studies conducted over the past five years in augmented reality and foreign language teaching, each of which has received a certain level of citation. As recommended by Dey for researchers conducting document analysis, inclusion and exclusion criteria were established before initiating the research (1993, p. 105). When selecting the articles, the inclusion criterion was that they should have been published in journals indexed by SSCI, SCIE, ESCI, Scopus, or ERIC. Studies published in journals except these indexes were excluded from the research. The articles to be examined are listed alphabetically in the table below and are explained in detail beneath the table. Since the researcher observed the journal indexes between September and November 2024, any subsequent changes in these indexes should be taken into consideration in future studies.

**Table 1**

*Studies on Augmented Reality and Foreign Language Teaching*

| Author | Year of Publication | Name of the Journal | Indexes | Citations |
|---|---|---|---|---|
| Cai et al. | 2021 | Journal of Computer Assisted Learning | SSCI, Scopus, Eric | 72 |
| Garzón & Acevedo | 2019 | Educational Research Review | SSCI, Scopus | 489 |
| Karacan & Akoğlu | 2021 | Shanlax International Journal of Education | Eric | 92 |
| Min & Yu | 2023 | Sustainability | SSCI, Scopus | 21 |
| Parmaxi et al. | 2020 | Journal of Computer Assisted Learning | SSCI, Scopus, Eric | 230 |
| Punar Özçelik et al. | 2022 | Participatory Educational Research | Scopus | 29 |
| Wedyan et al. | 2022 | Electronics | SCIE, Scopus | 48 |
| Wen | 2021 | Educational technology research and development | SSCI | 127 |

The study conducted by Cai, Pan, and Liu is a meta-analysis published in 2021. As emphasized by the authors, there is a limited number of studies on augmented reality in foreign language teaching and

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learning. Among articles published between 2008 and 2020, 21 studies meeting the inclusion criteria were identified and included in the meta-analysis. This study reviewed only research conducted with an experimental group and written in English. "The pooled effect-size estimate was 0.93" for language improvements and 0.42 for motivation, indicating that AR applications have a substantial impact on learners' language progress and a minor to moderate impact on their motivation (Cai et al., 2021, p. 929). The results of the moderator analysis indicated that learners' educational levels and the length of the interventions are significant factors that influence the effect of AR on their motivation. The analysis of AR applications in language learning indicated a large positive impact on students' language development and a small to moderate effect on their motivation. These results highlight the powerful capacity of AR to boost language learning acquisition and assert that AR-based materials could help presumably increase their motivation. Relative to other educational fields, research on AR in language education is not common, so this meta-analysis, according to the authors, may offer support for AR's role in language learning and inspire educators and researchers to integrate AR and explore it further (Cai et al., 2021).

Like the study by Cai et al., Garzón and Acevedo (2019) also conducted a meta-analysis exploring the topic of augmented reality in education. The authors noted that most studies on the specified topics were qualitative and did not evaluate the impact of augmented reality in educational settings. While augmented reality originated in the early 1990s, its use in education only began to gain prominence around 2010. Therefore, this study reviewed 64 articles employing quantitative methods over an eight-year period (2010–2018) to determine the effect of AR on students' learning outcomes. As the results demonstrate, augmented Reality has a moderate impact on students' academic achievements, with undergraduate students gaining the most from these technologies, particularly in Engineering and Arts and Humanities. Highlighting gaps in the literature, the authors indicate that there is a lack of meta-analyses on augmented reality conducted with students in areas such as "Early Primary Education," "Post-Secondary Education," "Postgraduate Education" as well as in fields like "Business, Administration and Law," "Agriculture, Forestry, Fisheries, and Veterinary and Services." They recommend that future research be conducted in these areas (Garzón & Acevedo, 2019, p. 256).

Karacan & Akoğlu (2021) published their study on augmented reality and foreign language teaching in the Shanlax International Journal of Education. According to the authors, although AR technology is more commonly used in fields such as medicine, anatomy, and science, its application in foreign language education remains limited. The authors classify these AR tools into three distinct classes: "image-based AR, creation-based AR, and markerless AR" (2021, p. 70). Image-based AR applications can be obtained from major physical stores or online platforms, and the necessary software can then be downloaded from the Internet. This process allows for using flashcards, which are often not specifically designed for foreign language learning, by language learners. These flashcards can be used independently by the learner or under the guidance of a teacher, particularly to enhance vocabulary acquisition. For instance, learners can engage with flashcards that integrate AR technology to visualize and interact with words and concepts, making the learning process more dynamic and memorable. Examples of applications in this category include 4D Flashcards, Quiver, Space 4D+, Animal 4D+, and Dinosaur 4D+. These tools enable users to interact with augmented 3D representations of animals, objects, or concepts by scanning the physical cards, creating an immersive language learning experience. Such applications are efficient for young learners or beginners, as they combine visual stimuli with language input to strengthen word associations and retention. The second category of augmented reality, markerless AR, consists of ready-to-use instructional materials. However, the authors note that some AR applications developed in this category may not fully align with the teacher's specific objectives in the classroom and may, therefore, require adaptation by the teacher to suit the lesson. Applications such as "Elements 4D, DevAR, AR Real Animals, ARZoo, Catchy Words AR, CoSpaces Edu, Figment AR, and Metaverse" serve as examples of this AR category (Karacan & Akoğlu, 2021, p. 70). The third and final AR category, creation-based AR, allows users

to design custom photos, videos, music, or 3D models using an AR application. Examples of AR applications in this category include "Blippar, HPReveal, Augment, PlugXR, Zapworks, Layar, Arloopa, Quiver, Metaverse, CoSpaces Edu, UniteAR, and ARize" (Karacan & Akoğlu, 2021, p. 70).

Using the Quiver application, as illustrated below, the students draw pictures of any object or animal they choose (shown on the left). Then, this drawing is brought to life through Quiver, an augmented reality (AR) application on their phone. In this case, since the drawing is of a lion, the AR technology animates the lion, which roars when the student taps on the screen (shown on the right).

**Figure 1**

*Animation of a Lion Drawing Coming to Life Through the AR Application Quiver.*

As illustrated above, the AR application Quiver can generate an exceptionally engaging and interactive learning experience for teaching foreign languages, especially children. With the lion drawing, students can enhance their vocabulary—for instance, learning animal-related nouns and verbs (e.g., "lion," "mane," "roar," "run") or adjectives to describe the lion (e.g., "fierce," "majestic," "golden"). This lion can also be used for speaking activities. For example, students can describe the lion's actions, such as "The lion roars" or "The lion is running." Additionally, role-playing activities can be introduced: one student pretends to be the lion while another acts as a different animal. They can then ask each other questions about their habitats, behaviors, or diet. They can make cultural comparisons by exploring how lions are perceived in different cultures and languages and discussing idioms, myths, or symbols. Students can also describe the actions of the lion or other animals animated through the AR application, practicing verb conjugations (e.g., "The lion jumped," "The lion slept") and conditional sentences (e.g., "If the lion roars, the animals run away"). This approach allows them to engage in grammar exercises effectively. By integrating the AR lion drawing into these activities, the lesson becomes more dynamic, sparking curiosity and fostering language learning in a fun and memorable way. Similarly to Quiver, the Halo AR application can also be effectively and appropriately used in foreign language teaching classrooms. The Halo AR application mentions that AR can be used not only with photos and drawings but also with books or magazines to add audio narration, images, videos, and more.

The study published by Min and Yu in 2023 is a bibliometric analysis focused on qualitative and quantitative research combining the fields of foreign language teaching and augmented reality (AR). Using bibliometric tools such as VOSviewer and CitNetExplorer, the authors examined the top ten authors, sources, countries, and organizations. The study's findings show that students and teachers demonstrated

a favorable perspective toward using AR tools in language education. Games, 3D visuals, and videos are primary methods for integrating virtual elements into the real world, with HP Reveal being the most commonly utilized tool in AR-supported learning. Additionally, the research revealed that AR applications can improve language learning by creating a captivating learning environment, boosting impulse, fostering communication, and alleviating concern. As a growing technology, augmented reality is progressively entering the education sector. However, the language skills currently incorporated into AR applications involve relatively more straightforward cognitive tasks, such as pronunciation, understanding meanings, and vocabulary development. As the authors indicated, more advanced language skills, such as reading and writing, are noticeably absent from AR applications (Min & Yu, 2023). Among the study's findings, the top 10 most-cited research papers on AR and education worldwide, along with their authors and countries, were identified. In this regard, the study contributes to the field.

In their study, Parmaxi et al. (2020) conducted a systematic review covering the years 2014 to 2019. Based on the study's results, the AR dataset highlighted that mobile-based AR, primarily using smartphones or tablets, was employed by the majority of researchers (63%), along with "a range of devices and software for initiating AR" (Parmaxi et al., 2020). Regarding "Vuforia, HP Reveal (formerly Aurasma), and ARIS (Augmented Reality and Interactive Storytelling)," "an open-source game editor," have captured the interest of researchers in the realm of mobile-based AR (Parmaxi et al. 2020, p. 865). In terms of the target languages examined, "English (63%) and Chinese (14%)" are the most frequently studied languages. The potential of AR to assist learners with special needs in acquiring sign language is also highlighted in this study. According to the referenced study, it was observed that thirty four studies focused on English as the target language in AR research, eight studies on Chinese, four on sign language, one on French, and so on.

Punar Özçelik et al. (2022) examined seventeen experimental studies conducted between 2017 and 2021 that combine foreign language teaching and augmented reality. These studies were discussed from various perspectives, such as research methods, tools, and contexts, AR applications, and the findings of the studies. Regarding data collection methods, most experimental studies employed pre- and post-tests, along with various questionnaires, in alignment with their research objectives. Among the seventeen studies, seven were conducted in Taiwan, highlighting a significant gap in the literature due to the lack of diverse study contexts published in the selected prestigious journals. The remaining studies were carried out in several countries like Spain, Turkey, and others. Examining research features indicated that most studies utilized an experimental design, employing various data collection methods. These studies predominantly focused on vocabulary acquisition, motivation, and attitudes, with most participants being university students in Taiwan. According to the authors, the effectiveness of AR has been demonstrated by numerous studies, highlighting the need for greater incorporation of AR in language education to improve language skills, such as reading, listening, speaking, and writing. The integration of AR into language classrooms remains inadequate, highlighting the need for additional research on effectively incorporating AR technology into language teaching and learning in multiple dimensions.

Another study was carried out by Wedyan et al. (2022), seeking to investigate the significance of augmented reality (AR) in developing English language skills from the viewpoints of English teachers and educators. A mixed-method approach, incorporating qualitative techniques, was employed. To address the study's objectives, twelve interviews were conducted with English teachers to gather insights on the subject. A systematic literature review (SLR) was also undertaken to examine the benefits, limitations, and methodologies of using AR for English language learning. The study determined that AR enhances language skills and academic performance while reducing students' anxiety, fostering creativity, and promoting greater collaboration and engagement. Additionally, students expressed positive attitudes toward employing AR to learn English.

In Wen's (2021) study, the impact of an AR-based Chinese character learning game on students' cognitive engagement in classroom learning was examined, with the participation of 53 second-grade students and two teachers. The results reveal a clear development in students' cognitive engagement levels during the AR-based activities. Moreover, unlike learning expert-developed content, students remain more consistently involved in teaching tasks designed to facilitate self-generated contexts.

While the study does not encompass the year in question, Perry's (2015) use of an augmented reality-supported mobile application in teaching the French language is noteworthy, having received over 300 citations. This research primarily aims to evaluate the effectiveness of a new mobile learning tool, called *Explorez*. Designed for first-year French students at the University, *Explorez* seeks to combine gaming and education through quest-based learning and augmented reality. Benefiting from GPS, *Explorez* transforms the University of Victoria campus in British Columbia into a virtual francophone environment, allowing students to engage with characters, objects, and media while enhancing their French language proficiency and exploring their campus.

Augmented Reality (AR) can be a powerful resource in foreign language teaching and learning by creating immersive, interactive, and contextual learning settings that render language practice both captivating and applicable. With the integration of AR into foreign language teaching, students are expected to engage in real communication scenarios within virtual environments, allowing them to interact by speaking in the target language. Consequently, students are believed to become more motivated, learn the language more enjoyably and dynamically, and develop a more positive attitude toward collaborative learning.

## Conclusion

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This research accentuates the pivotal role of augmented reality (AR) in transforming foreign language teaching methodologies by integrating technology that meets linguistic and cultural learning needs. As AR technologies advance, their application in education signals a change toward innovative experiential and interactive learning models. This change aligns with the "Action-Oriented Approach" outlined in the Common European Framework of Reference for Languages (CEFR), which emphasizes immersive, student-centered learning. In foreign language teaching and learning processes, AR tools enable learners to immerse themselves in the target language's language and the cultural contexts (primarily English, German, or French in Turkey), fostering a comprehensive multilingual and multicultural experience.

The analysis of relevant studies obtained through databases such as Web of Science, SCOPUS, and ERIC reveals that AR contributes to critical dimensions of educational effectiveness, including enhanced motivation, increased class participation, and accelerated learning. Most of the studies examined in this research provide evidence that AR-supported language programs can improve students' engagement and comprehension, enabling them to practice language skills within a simulated but contextually authentic environment. The implications for foreign language learning are significant. AR technologies not only help overcome traditional barriers associated with language acquisition, such as lack of context and limited exposure to the target language's culture, but they also facilitate the practical application of linguistic skills through authentic real-life scenarios.

However, while AR demonstrates significant potential, this study also emphasizes the critical need for further investigation into the effectiveness and accessibility of AR-based language learning programs. The documented challenges, including high costs, technical difficulties, and the necessity for adequate teacher training, could limit the widespread integration of AR across diverse educational settings. Thus, it is recommended that future studies explore cost-effective and scalable AR solutions to satisfy the needs

of various educational contexts. Furthermore, examining the sustained impact of AR on both language proficiency and cultural understanding could provide deeper insights into its actual impact on language learning. Since the studies conducted on AR and reading and writing skills in foreign language teaching are not frequent so far, future research in this area could also be recommended.

From a methodological standpoint, qualitative document analysis enabled an in-depth exploration of AR's contributions to foreign language teaching. The qualitative method adopted, which involved skimming, reading, and interpreting a broad selection of academic papers, provided a nuanced understanding of how AR is currently perceived and applied in educational research. The recurring themes suggest a strong consensus on AR's potential to foster meaningful language experiences but also point to a need for rigorous and standardized assessment methods to evaluate AR's efficacy across different language learning contexts. Future studies could benefit from a mixed-methods approach, combining qualitative insights with quantitative data to establish a more holistic approach to AR's influence on language learning outcomes.

The findings from this research contribute to the existing literature on technology-assisted language learning and emphasize educators' evolving role in this landscape. With the rise of AR, educators are no longer merely transmitters of information but rather facilitators of immersive learning experiences that require new pedagogical skills. To support this transition, educational institutions should consider investing in AR training programs for teachers and developing curriculum guidelines that effectively incorporate AR into language teaching strategies. As AR continues to evolve, its application in foreign language teaching and learning will likely expand, making it a valuable tool for promoting linguistic and cultural competence in a globalized world.

In conclusion, augmented reality represents a transformative force in foreign language teaching and learning, and this development aligns with contemporary theories of language acquisition and cultural learning. By creating a motivating, immersive learning environment, AR ameliorates language acquisition and supports the broader goals of multilingualism and multiculturalism outlined by frameworks like the CEFR. As research in this field grows steadily, so will our understanding of how best to utilize AR's potential to create more engaging, effective, and culturally rich language learning experiences.

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