

# Exploring the Nexus of English language Learning and Technology: A Comprehensive Study on Augmented Reality Applications in Academic Settings

Putri Amalia Rizkina<sup>1</sup>, Zelitta Marsha Nabilla<sup>2</sup>

<sup>1,2</sup>Department of English Language Education, School of Graduate Program,  
 Universitas Muhammadiyah Purwokerto, Indonesia

ARTICLE INFO	ABSTRACT
<p><b>Article history:</b></p> <p>DOI:  <a href="https://doi.org/10.30595/pssh.v2i1.1508">10.30595/pssh.v2i1.1508</a></p> <p>Submitted:            Jan 25, 2025</p> <p>Accepted:            Apr 16, 2025</p> <p>Published:            Apr 25, 2025</p> <hr/> <p><b>Keywords:</b></p> <p>Augmented Reality; AR            Mobile Device; English            Language Learning</p>	<p><i>Particularly at the higher levels of education, online learning is quickly growing throughout the 4.0 educational landscape. The incredible progress of technology has revolutionized education when paired with suitable pedagogy. This integration has opened up numerous possibilities for improving teaching quality using available technology. One of the newest technologies to aid in making learning dynamic and interesting is augmented reality. The widespread use of mobile devices worldwide is correlated with the widespread use of augmented reality. The article examines the dynamic interaction of learning English and augmented reality. Thus, this research presents the pedagogical potentials of mobile augmented reality by reviewing many works of literature in the field. After listing the empirical research on AR taken from ProQuest, Elsevier, Eric, Researchgate, DOAJ and national journals, this review discusses its advantages and disadvantages, especially with regard to English as a foreign language, and its practical applications which can be used for developing Augmented Reality materials. Further research also needs to investigate diverse mobile AR apps with QR code for more engaging virtual online courses.</i></p> <p><i>This work is licensed under a <a href="https://creativecommons.org/licenses/by/4.0/">Creative Commons Attribution 4.0 International License</a>.</i></p> <div data-bbox="595 1641 774 1706" data-label="Image">  </div>
<p><b>Corresponding Author:</b>  <b>Putri Amalia Rizkina</b>            Universitas Muhammadiyah Purwokerto            Jl. KH. Ahmad Dahlan, Dukuhwaluh, PO. BOX 202 Purwokerto 53182, Indonesia            Email: <a href="mailto:putriamalia.ump@gmail.com">putriamalia.ump@gmail.com</a></p>	

## 1. INTRODUCTION

In order to raise student learning achievement and enhance school quality, teaching and learning activities involve more than merely mutually beneficial engagement during the learning process. Interactions with the information or material delivery tools can result in learning (Novitasari et al., 2021). Learning media are these means of information delivery. Supporting elements for learning activities are necessary, and learning media is one of them. Learning media is one of the instructional resources that teachers can utilize to carry out lesson plans and encourage student creativity and focus throughout the learning process so that students are motivated to study (Tafonao, 2018).

Utilizing technology to learn through media can give students a head start on creating more engaging learning strategies. In order to attract students to the learning process, technology development can also be used to innovate learning media development (Sulistiani et al., 2021). Teachers can communicate with students using learning media. In this instance, it piques students' interests, thoughts, feelings, and attention in order to integrate the learning process (Elmunsyah et al., 2019). Learning media have the advantage of making abstract ideas tangible, presenting objects that are hard to obtain, allowing students to see classroom objects, and demonstrating actions that are too rapid or sluggish (Isa et al., 2022).

In the rapidly evolving landscape of education, the integration of technology has become a catalyst for transformative learning experiences. The challenge is to integrate technology into the learning and teaching process while reflecting the digital habits of the current generation. Augmented reality (AR) is one of the technologies that help with the learning process. In addition, one particular technological advancement that has captured the attention of both educators and learners is Augmented Reality (AR). As traditional language learning methods undergo a digital transformation, augmented reality is emerging as a powerful tool that has the potential to revolutionize the way we acquire and master new languages.

This article explores the dynamic interaction between learning English and augmented reality, taking the reader on a linguistic adventure. With augmented reality (AR), language learning is no longer limited to textbooks and classrooms. Instead, it offers students a real-world context in which to hone their skills. The combination of augmented reality with English language education presents a wide range of opportunities, from gamified vocabulary training to virtual language exchanges.

According to Bucher and Grafe (2018), augmented reality (AR) can improve material comprehension, interactivity, memory retention, and motivation compared to traditional media formats. Motivation is crucial for successful learning outcomes. According to Duarte, Cardoso, and Lamounier (2005), interactive and graphically rich AR applications are more appealing and inspiring than standard media tools. According to Johnson et al. (2010), augmented reality (AR) can enhance learning by exploring the interconnectedness of knowledge in the actual environment. According to Luckin and Fraser (2011), experiential learning is essential. As technology advances, sensors like motion, monitor, touch, and sound enhance our experiences (Somyürek, 2014). Augmented Reality provides students with real-world visuals of their subject in 2D and 3D formats, making it more useful for learning.

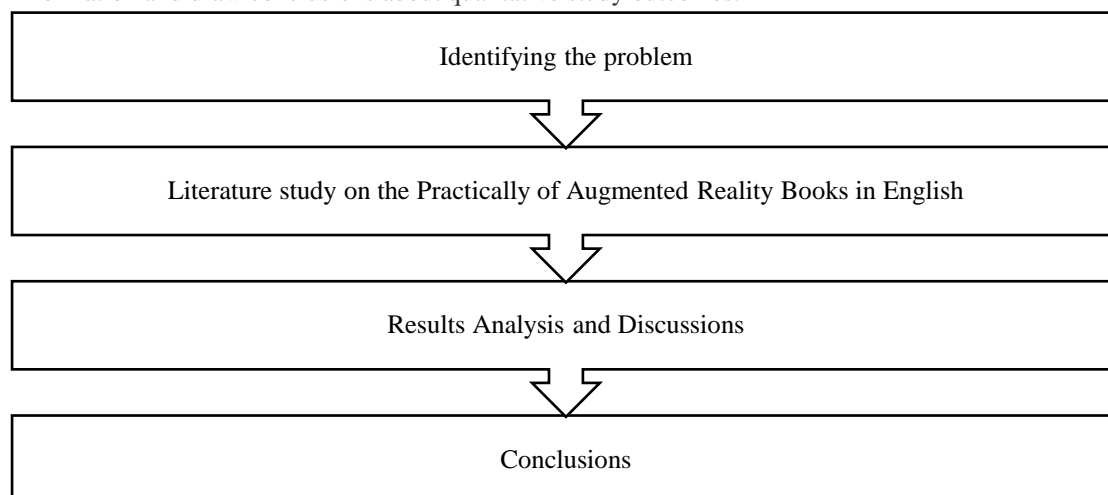
Augmented reality technology combines 2D or 3D virtual items and projects them in real-time (Alyousify & Mstafa, 2022). Augmented reality (AR) is a type of virtual (apparent) extension of reality in which, for example, virtual items can be projected onto the real environment by glancing around with a mobile phone camera or with glasses designed for this purpose (Simon, 2023). Using appropriate senses (such as sound, sight, touch, and emotions) enhances learning effectiveness. According to Luckin and Fraser (2011), augmented reality is a promising educational technology.

Augmented reality is crucial for achieving high-quality learning outcomes, as mentioned above. According to Malina et al. (2021), learning in the classroom involves both internal and external influences. It

requires a realistic learning medium for perceiving objects. This study examines 1) the advantages and disadvantages of augmented reality learning media in English learning, as it can help visualize abstract concepts, compile models, and improve science learning quality (Rahmawati et al., 2022), 2) the practical AR application that can be used for developing AR apps.

## 2. METHODOLOGY

This descriptive research uses the literature method to identify, analyze, and interpret connected research issues (Hamilton et al., 2021). A variety of sources, including journals, books, and the internet, provide information about the practicality of augmented reality. The literature review method analyzes and evaluates relevant studies to answer research questions, provide additional learning materials, and identify gaps for future research (Nistrina, 2021; Ariyanto et al., 2021). This inquiry included up to 45 trustworthy publications and articles from ProQuest, ERIC, Elsevier, Researchgate, DOAJ, and national journals. The journals and texts analyzed were published between 2018 and 2023. **Figure 1** depicts the methods used by researchers to obtain information and draw conclusions about qualitative study outcomes.



**Figure 1.** The Research Flow

This study's initial part focused on identifying issues with schooling. The second stage involved reviewing up to 30 national publication and international scopus indexed publications and articles which were published between 2018 and 2023 about the applicability of augmented reality application. The third stage of the research process is analysis, which the researcher undertook after reading pertinent articles, followed by a discussion of the results. The conclusion in the fourth stage is based on the findings and analysis from reading pertinent articles.

## 3. RESULTS AND DISCUSSIONS

### A. *The advantages of Augmented Reality*

The results and discussion section contains findings that include data sources and/or informants and research data. Then, the data analysis and discussion are scientifically explained. Research results must be able to answer the hypothesis or research questions described in the introduction. Scientific findings from the conducted research result are supported by adequate data.

Scientific findings should be explained methodically and include the following questions: What scientific findings does this research obtain? Why does it happen? Why does the variable trend be like that? All these questions must be answered with the support of adequate empirical and non-empirical data, not only descriptive

ones. Tables can be added and should be numbered serially and referred to in the text by number (table 1, etc.). Each table should have an explanatory caption which should be as concise as possible.

### **B. The Practical AR application for building augmented reality objects**

After conducting a literature review on potential apps for developing mobile Augmented Reality, the researcher has identified the following as useful options:

#### **1. Quiver 3D**

Quiver-3D Coloring application is available on Quivervision (<http://www.quivervision.com>), a startup that specializes in Augmented Reality technology and focuses on coloring techniques that can be used by people of any age. The Quiver App blends physical coloring of the "past" with advanced technology to provide us and our children with an unforgettable magical experience. Quiver-3D Coloring is an appropriate application for sketching of all ages. Not only does drawing add creativity but also entertains us because the results appear realistic. It's far more enjoyable to teach students about the art of painting and storytelling. The application includes all of the following features: a large assortment of photos with barcodes; the ability to not only display image results but also create moving images; a variety of intuitive and entertaining animated movements; and sound for each image (Kisno et al., 2023). **Figure 2** shows the following application uses a work system sequence image.



**Figure 2.** Order of work systems quiver application based on AR and Digital Storytelling

#### **2. Unity 3D and Vuforia SDK**

Unity can adopt the same orientation as the actual world. Vuforia creates augmented reality using smartphone cameras and displays it on screen. In this scenario, the researcher uploads the image of the flashcard and 3D object to employ the technique (Rahman et al., 2023). This app needs marker to pop up the augmented reality objects.

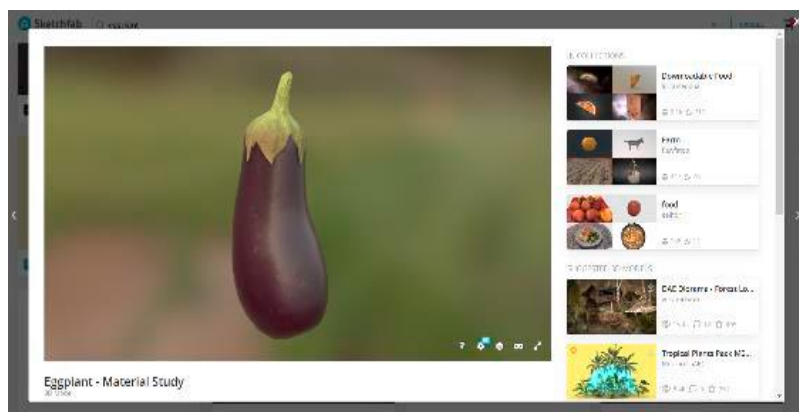


**Figure 3.** The AR app developed using Unity 3D and Vuforia SDK

#### **3. Sketchfab 3D**

Sketchfab 3D is a web-based platform that provides 3D models where users can discover, share, and view 3D content. The researcher uses this software since it's quick and handy for all of the participants. The Sketchfab

3D can be accessed on <https://sketchfab.com/>. The example of AR objects developed using Sketchfab 3D is as follows:



**Figure 4.** The AR app developed using Sketchfab 3D

#### 4. Interactive AR Map

Interactive AR Map involves combining digital information with the user's real-world environment. It provides 3D models of buildings, geographical information, landmarks, etc. To connect the AR Map, the users can use the rear camera to integrate it. The users have to ensure their compatible map data to display it with AR experience. AR Map is a noteworthy application that exemplifies one of the fastest-growing advances in augmented reality technologies. Its main goal is to improve physical maps through the smooth integration of useful and real-time data. Unlike conventional paper maps, which have stationary surfaces, ARMap makes the advantage of augmented reality to provide users with a transparent lens, removing the need for them to physically examine the map. With the use of virtual graphics, this program enhances users' environment and blends in with their daily life. Students showed a generally positive motivation to learn from the contextualized learning boosted by AR.

When it came to learning value, proactive learning, and self-efficacy, the skilled learners were more motivated. While all students demonstrated a positive attitude toward learning, proficient students demonstrated higher levels of confidence, preferences, learning process, and learning strategy while displaying lower levels of anxiety. Students who learned without captions also demonstrated greater degrees of confidence and preference (Romli et al., 2021)



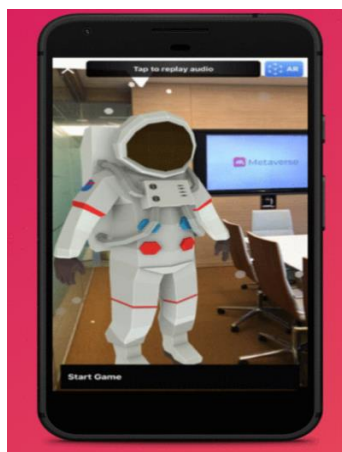
**Figure 5.** The learners can trigger a theme-based learning activity with an AR interaction by scanning a specific AR marker on the interactive-AR-map.

#### 5. Metaverse

The metaverse is a digital landscape that participants can use to build their own virtual environments. It's also a space for users around the world to connect in a more human way than other methods (Moeller, 2022).

Metaverse learning environments can also promote safety in a way that real-world teaching simply cannot. In the metaverse, educators will have complete control over student interactions and can limit bullying or separate children for disciplinary purposes by simply changing some permissions in the virtual space (Moeller, 2022). Students and teachers can connect in the virtual world via their virtual reality headsets, regardless of where they are in real life. For individuals who are motivated to pursue it, such functionality can lead to improved education.

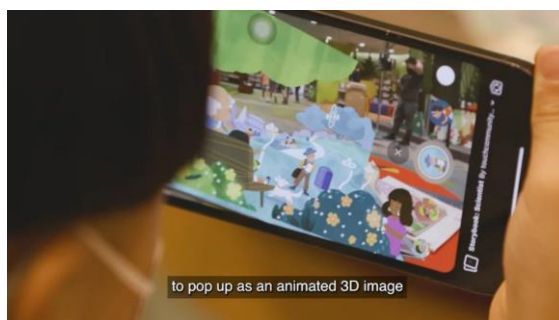
A permanent parallel reality opens up a world of possibilities, with a particularly significant impact on education. Consider one of the virtual reality classes that could be created. Imagine a language class that need a visual for strengthening the students' understanding about a specific building, town, country, culture, or simple things around them. Teachers and students are not only able to discover new vocabularies and new insight of certain cultures but they can also have an immersive 3D environment. Desks and chairs can be replaced at any time with an in-person replica of a historical landmark. Students are free to explore as they choose, ask, and experience the learning through Metaverse. Metaverse can be accessed through <https://studio.gometa.io/landing/auth/login>. Herewith the example of augmented reality object developed using Metaverse:



**Figure 6.** The AR developed using Metaverse Studio

#### 6. AR Storybook

AR Storybook is a contemporary, interactive retelling of a classic storybook that uses augmented reality technology to improve the reading experience. Readers are given a more immersive and captivating storytelling experience using AR Storybooks, which combine digital features with real book pages.



**Figure 7.** My Favorite Days AR Storybook

#### 7. Google ARcore

Fundamentally, ARCore does two things: it tracks the position of the mobile device as it moves and develops its own understanding of the real environment. ARCore's motion tracking technology uses the phone's camera to find interesting points, known as features, and tracks how they move over time. ARCore determines the phone's position and orientation as it moves across space using a mix of point movement and readings from the

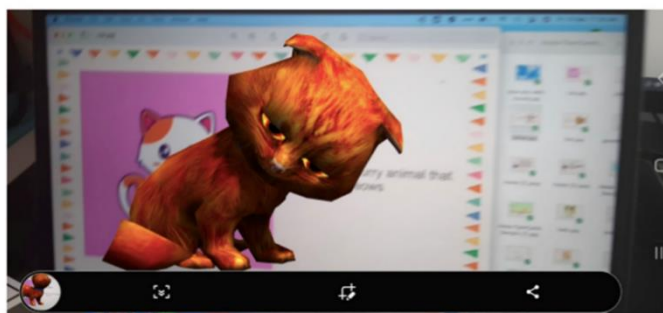
phone's inertial sensors. In addition to detecting critical spots, ARCore can detect flat surfaces such as tables and floors and estimate the typical lighting in the surrounding area. These features work together to enable ARCore to develop its own understanding of the environment around it. Google ARCore can be accessed through <https://developers.google.com/ar>.



**Figure 8.** The Augmented Reality using Google ARCore

#### 8. A Real-Vocab mobile app

This app was designed and developed by students of UiTM (Universiti Teknologi Mara), Malaysia. This app genuinely helped mildly autistic children's interest in the language learning process by making the acquisition of English vocabulary more interesting and meaningful. All those participating in this research should gain from the results, especially parents of autistic children and educators working with autistic children. Based on the result, the researchers successfully stimulated language articulation and pronunciation skills at home with the AReal-Vocab augmented reality mobile application (Hashim et al., 2022).



**Figure 9.** The 3D feature of the designed and developed AReal-Vocab mobile application

#### 9. Mondly AR

The application is designed to provide interactive lessons, pronunciation practice, and conversations to help students improve their English language skills. It has several tools, for instance, virtual language teacher, 3D model for the real-life environment, real-life conversations. Then, the users will experience more fun and interactive learning because the app has designed the same with the real environment. For example, when users tap the guitar, it will play a song. Mondly can be accessed through <https://www.mondly.com/ar>.



**Figure 10.** The Augmented Reality using Mondly AR

#### 10. AR Flashcards

This app combines AR with an animal-themed alphabet to help young learners associate letters with corresponding animals. It's a playful way to introduce the English alphabet and basic vocabulary. Teachers can download flashcards through this app to teach English vocabulary for young learners. AR Flashcards can be accessed through <https://arflashcards.com/>.



**Figure 11.** The Augmented Reality using AR Flashcards

After reviewing the literature, it is found out that augmented reality technology has increased students' motivation in learning English. It also strengthens students' engagement in physical tasks. As is said by (Atalay, 2021) It enhances students' learning by attracting attention and motivation, encouraging participation, sparking interest and curiosity, making the course enjoyable, and facilitating learning. Augmented Reality also highlights the strength of immersive learning that occurs during the use of AR app in the classroom. Plus, AR apps increase students' critical thinking because it offers technological competence. According to Sirakaya (2018), AR applications can effectively teach abstract concepts to primary and secondary school pupils. According to Abdüsselam & Karal (2012), Shelton & Steven (2004), and Wojciechowski & Cellary (2013), augmented reality can help teach abstract concepts by making them more concrete. It is effective at teaching complicated and difficult subjects (Kaufmann, 2003).

According to Shelton and Hedley (2002) and Yuen, Yaoyuneyong, and Johnson (2011), it is possible to teach about events and situations that cannot be demonstrated in a classroom setting. Several research have found that Augmented Reality apps improve success (Abdüsselam & Karal, 2012; Chiang et al., 2014; Dunleavy, Dede

& Mitchell, 2009; Ersoy, Duman & Öncü, 2016; Kırıkkaya & Şentürk, 2018; Küçük et al., 2014; Sırakaya, 2015). The limitation of AR apps also existed. That the AR app is not recommended for frequent usage is one of the limitations. This Augmented Reality may not be suitable for all English topics. Based on the literature, the use of the AR app requires training, especially for the teacher who will firstly introduce and run the apps as an example for students. It is time-consuming to plan and implement, not ideal for all subjects, challenging to prepare, and can lead to classroom management issues, technical challenges, and inability to use technology effectively (Atalay, 2022).

#### 4. CONCLUSIONS

**Fundamental Findings:** The literature review process has led to the following conclusions: 1) The use of augmented reality as a tool for interactive instruction in schools is not yet widespread, 2) Augmented reality can help educators provide knowledge to students beyond video conferencing, 3) the practicality of augmented reality application in English language learning is highly significant to be used, 4) the AR app is considered to improve the quality of students' English learning, 5) Quiver, Unity 3D & Vuforia SDK, Sketchfab 3D, Interactive AR Map, Metaverse, AR Storybook, Google AR Core, A Real-Vocab Mobile App, Mondly AR, AR Flashcards are practical apps which can be used for developing augmented reality material.

**Implication:** The findings in this study can be used as references to develop more AR applications based on the desired topics. **Limitation:** The number of articles used in this research is limited to 45 from Proquest, Eric, Elsevier, Researchgate, DOAJ, and national journals. **Future Research:** Further study should focus on developing interactive augmented reality applications for English learning, including a QR code scan function that is popular among students due to its convenience.

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