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A review of English language learning using augmented reality, virtual reality, and artificial intelligence technologies

Sholpan Zhubanova[a1], Kazakh-British Technical University, Almaty, Kazakhstan
Jeffrey Raymond Stier [b], Lecturer of Satbayev University. Almaty, Kazakhstan
Rinat Beissenov [c], Kazakh-British Technical University, Almaty, Kazakhstan

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Abstract

This study investigates the current applications of augmented reality and virtual reality in English language learning, focusing on their potential to enhance language proficiency, cultural understanding, and student motivation. Despite growing interest in immersive technologies, research on their integration in language education remains limited, particularly regarding empirical evidence of effectiveness. The study aims to examine how augmented reality and virtual reality techniques can enrich instructional practices and bridge the gap between classroom learning and real-world experiences. The methodology involved surveys, interviews, and experimental analysis with 103 participants randomly assigned to an experimental group, which received AR and VR-enhanced instruction, and a control group, which followed traditional methods. The experimental intervention included virtual language simulations, interactive exercises, and immersive learning environments. Findings indicate that AR and VR applications positively influence student engagement, learning outcomes, and adaptability to diverse learning styles. The study underscores the significance of integrating immersive technologies in language education and highlights the need for continued research and development to optimize instructional design and educational impact.

***Keywords**:* Augmented reality; education; immersive learning; language learning; virtual reality.

* ADDRESS FOR CORRESPONDENCE: Sholpan Zhubanova, Kazakh-British Technical University, Almaty, Kazakhstan
E-mail address: sholpa1511@mail.ru

1. INTRODUCTION

The incorporation of technology in education has revolutionized language learning, with Augmented Reality (AR) and Virtual Reality (VR) techniques among the most promising advancements (Balalle, 2025). Adoption of AR and VR in language instruction in Kazakhstan (KZ) technical university has gained recognition for its ability to captivate students, foster interactive learning environments, and provide immersive experiences. Based on existing research, Bonner and Reinders (2018) acknowledge the prevalence of AR and VR technologies, highlighting their potential in language learning.

Notably, AR has been shown to boost motivation and encourage language use outside of the classroom, whereas VR has allowed for deeper connections with classroom topics. The purpose of this article is to investigate the current landscape of AR and VR applications in English language learning at Kazakh-British Technical University (KBTU), thoroughly examining the benefits, challenges, and future implications. The review seeks to shed light on the effectiveness of AR and VR techniques in improving language proficiency, cultural understanding, and student motivation by analyzing existing literature and research studies. The findings of this review will be invaluable to KZ university educators, policymakers, and practitioners, guiding future advancements and facilitating the seamless integration of AR and VR techniques into English language education. Furthermore, authors like Al-Ansi et al. (2023) and Kumar & Gorai (2025) investigate the potential of AR and VR technologies to improve the educational system as a whole. They emphasize how AR and VR provide immersive digital experiences that go beyond traditional teaching methods, allowing students to interact with complex material in new and exciting ways.

These technologies can be customized to individual learning styles, bridging the gap between classroom instruction and real-world experiences. AR adds digital content to the physical environment, whereas VR creates entirely new digital environments for exploration (Jiang et al., 2025; Lacle-Melendez et al., 2025). The article focuses on the advantages of AR and VR in online, mobile, and blended learning environments, demonstrating their ability to create virtual worlds, deliver interactive content, and facilitate simulations. Furthermore, the authors discuss the growing use of augmented reality and virtual reality in education, emphasizing their positive impact on student engagement and learning outcomes. They also discuss the challenges and opportunities of implementing AR and VR in educational settings, emphasizing the importance of ongoing research and development in this field.

1.1. Theoretical background

1.1.1. Augmented reality (AR) in English instruction

Several authors have written about the importance of augmented reality (AR) in education, particularly in English language teaching. Wedyan et al. (2022) and Magaña et al. (2025) highlight the potential of augmented reality (AR) to improve learning by superimposing virtual computer-generated information onto the real world. They emphasize that augmented reality (AR) can foster a positive learning environment, strengthen constructive learning principles, and promote effective learning. AR has been shown to improve students' reading skills, vocabulary acquisition, and English language learning. AR-enabled educational games and mobile apps have proven to be effective in creating an immersive and engaging learning environment (Salehi, 2025).

Karacan and Akoğlu (2021) discuss the use of augmented reality in language learning, emphasizing the positive impact of mobile augmented reality and game-based learning on language teaching. They emphasize the need for additional research in this area, pointing out that empirical research on AR-enhanced foreign language teaching is still limited. The authors divide AR applications for language education into three categories: image-based, creation-based, and markerless AR, emphasizing the importance of setting boundaries and specifications when implementing AR in education. Jamrus and Razali (2019) investigate the use of augmented reality (AR) in the teaching of English reading. AR technology, they explain, superimposes digital content onto the real world, creating an interactive and immersive learning experience. AR can improve students' motivation, comprehension, and vocabulary acquisition while reading.

According to the review, AR materials that incorporate animation and sound have a positive impact on students' motivation and academic achievement. Su et al. (2022) emphasize the importance of interactive and engaging teaching methods in English language education. They propose incorporating augmented reality (AR) technology into the STEAM framework to improve learning enjoyment and effectiveness. Previous research has found that AR improves students' comprehension and motivation to learn. When combined with the STEAM framework, AR games can increase learners' curiosity and interest in English.

1.1.2. Virtual reality (VR) in English instruction

Virtual Reality (VR) is a technology that creates a simulated environment that can be similar to or dissimilar to the real world. It provides ESL learners with an immersive learning experience that improves their engagement, motivation, and collaboration skills. Virtual reality can be used effectively to teach various aspects of the English language, such as pronunciation, listening, speaking, and cultural awareness. Samadbeik et al. (2018) discuss the use of virtual reality (VR) in medical education, emphasizing its use in simulating the peripheral world and the benefits it provides, such as personalized feedback, motor skill evaluation, and less harm to patients during training. McCurrach (2020) investigates the potential of virtual reality (VR) as a tool for teaching English, emphasizing experiential learning and constructivism, as well as collaborative learning, learner autonomy, contextual learning, and presence as advantages of VR in language learning.

Halabi (2020) and McCleery et al. (2020) show that virtual reality can improve engineering education and teaching while also providing intervention mechanisms for autistic individuals' social skills. Carbonell-Carrera et al. (2021) investigate users' virtual reality experiences in a three-dimensional visualization environment. Xie et al. (2022) demonstrate how virtual reality technology can provide an immersive language learning environment while also improving language teaching effectiveness. Finally, Dobrova et al. (2017) discuss the origins and evolution of virtual reality (VR), its use in education, and its unique benefits, such as real-time visualization, interactivity, safety, immersion, and focus, which make it a valuable tool in language teaching, overcoming the limitations of traditional methods. Furthermore, Zhubanova et al. (2018) acknowledge that, while the full potential of virtual reality (VR) technologies in language learning has not yet been fully realized, there are already visible benefits.

VR can improve education by increasing student engagement and motivation and enabling effective communicative interaction. It allows you to practice your skills and abilities through simulated scenarios. VR can facilitate independent work, interactive interaction with electronic resources, and a practice-oriented approach in language learning. Zhubanova et al. (2018) also emphasize the didactic potential of online learning tools such as blogs and chat, which improve language teaching through a variety of activities. Another useful tool for developing written communication skills and documenting student progress is electronic portfolios, also known as web portfolios.

1.1.3. The distinctive features of AR and VR in language learning

AR and VR technologies have distinct characteristics that make them valuable educational tools, including language learning. AR is commonly experienced through digital games and travel apps, according to Bonner and Reinders (2018), whereas VR is associated with headsets that provide immersive virtual environments primarily used for gaming. They emphasize the importance of AR and VR in educational settings, citing examples such as pilot simulations, surgical training, and language learning. While AR and VR are frequently viewed as entertainment tools, their application in language classrooms has been limited.

Fitria (2023) discusses the unique characteristics of AR and VR in the context of English learning. AR augments the real-world environment with virtual information, giving it a more simplified appearance. Furthermore, it seamlessly integrates computer-generated 2D or 3D objects into the real world, creating an interactive and immersive experience. According to Fitria (2023), augmented reality (AR) is widely used in education as a learning medium to make it more interesting. VR, on the other hand, creates an immersive experience similar to the real world by simulating a virtual world that users can explore online. Furthermore,

VR employs input and output devices, allowing for direct interaction with the virtual environment. Fitria emphasizes that both AR and VR provide interactive and immersive experiences that improve language engagement and comprehension.

1.2. Purpose of study

Cevikbas et al. (2023) provide insights into the conceptualization of augmented reality and virtual reality technology, as well as previous reviews of AR/VR in mathematics education. They point out that AR superimposes virtual information on the real world, whereas VR transports the user to a virtual environment. Furthermore, AR enhances the real-world view by blending virtual objects with it, allowing for real-time interactivity and precisely aligning 3D objects. To create a convincing virtual world, VR uses visualization, immersion, and interactivity. Previous reviews have highlighted the benefits of AR in mathematics education for improving learning motivation, confidence, visualization, and spatial abilities. However, the combined impact of AR and VR technologies on mathematics learning processes necessitates further investigation via thorough systematic reviews. The study aims to examine how augmented reality and virtual reality techniques can enrich instructional practices and bridge the gap between classroom learning and real-world experiences.

2. METHODS AND MATERIALS

2.1. Participants

The study involved 103 intermediate-level students from Kazakh-British Technical University (KBTU) in Kazakhstan. Participants were recruited from language courses and represented a range of academic backgrounds. They were randomly assigned to one of two groups:

Experimental group: 53 students who received language instruction incorporating AR and VR techniques.

Control group: 50 students who received traditional language instruction without AR or VR integration.

Both groups received the same instructional content and duration to ensure consistency and minimize potential confounding variables.

2.2. Research design

A quasi-experimental design with pre-test and post-test measures was employed to examine the effectiveness of AR and VR in language learning. The design incorporated both quantitative (experimental analysis, surveys) and qualitative (interviews) methods, enabling triangulation of findings.

2.3. Data collection tools

2.3.1. Survey

A QR-based survey titled AR & VR in Language Learning (link) was administered to collect data on participants' experiences, perceptions, and attitudes toward AR and VR technologies in education. Questions addressed perceived benefits, challenges, efficacy in improving language proficiency, cultural understanding, and motivation. Students were given a QR survey on AR & VR in Language Learning to collect information about their experiences with using AR and VR technologies in education (See Figure 1).

2.3.2. Interviews

Semi-structured interviews were conducted with both students and instructors to gain deeper insights into experiences and instructional practices involving AR and VR. Topics included observed student engagement, instructional strategies, and implementation challenges.

2.3.3. Experimental analysis

Controlled experiments compared language learning outcomes between the experimental and control groups. Activities in the experimental group included virtual language simulations, immersive VR environments, interactive AR exercises, and virtual cultural field trips.

Figure 1

Survey: AR & VR technologies in language learning

What do you perceive as the potential benefits of using AR and VR in language learning? (Select all that apply)

- ☐ Enhanced language proficiency
- ☐ Improved cultural understanding
- ☐ Increased student motivation
- ☐ Interactive and engaging learning experiences
- ☐ Real-life application of language skills

In your opinion, what are the main challenges or limitations of using AR and VR in language learning? (Select all that apply)

- ☐ Limited access to AR and VR technologies
- ☐ Technical difficulties or system requirements
- ☐ High cost of implementation
- ☐ Lack of training or support for educators
- ☐ Integration into existing curriculum and lesson plans
- ☐ Limited availability of AR and VR content for language learning

2.4. Procedure

- Pre-test: All participants completed a standardized language proficiency test prior to the intervention.
- Intervention:
  - Experimental group: Received AR- and VR-enhanced instruction, including virtual field trips, immersive storytelling, AR-based vocabulary practice, grammar exercises, pronunciation feedback, and collaborative VR projects.
  - Control group: Received traditional language instruction using established classroom-based methods.
- Post-test: At the end of the intervention period, all participants completed the same proficiency test to measure improvement.

2.5. Data analysis technique

Quantitative data from pre- and post-tests were analyzed using descriptive statistics and independent-samples t-tests to determine statistically significant differences in mean scores between groups. Within-group progress was assessed through paired t-tests. Survey data were analyzed using frequency distributions

and mean scores to identify trends, while interview data underwent thematic analysis to extract recurring themes regarding experiences, challenges, and benefits of AR and VR in language learning.

3. RESULTS

Throughout the lessons, the lecturer demonstrated how to use web tools associated with AR and VR techniques. Following the completion of the experiment, the researchers created a table outlining the key features of the web tools used in the study. They identified any drawbacks, conducted interviews with students, and generated ideas for integrating AR and VR into classroom teaching (See Table 1).

Table 1

Web tools applied in learning a language

Web Tool Name	Description/Purpose	Drawbacks	Student Feedback	Integration with Classroom Learning
VR applications				
Canva	The graphic design platform offers a user-friendly interface and a variety of templates and tools for individuals and businesses to effortlessly create visually appealing content such as presentations, social media graphics, posters, and more, without requiring extensive design knowledge or software proficiency.	The platform and its resources cannot be accessed without an internet connection, which is a disadvantage when compared to professional design software.	Its user-friendly features, collaborative capabilities, and seamless sharing options all contribute to a positive user experience, allowing students to demonstrate their creativity and effectively communicate their ideas.	Canva provides a versatile set of design templates and tools that can be integrated into classroom learning, allowing students to create visual materials like presentations and infographics to improve their understanding of academic concepts, while also allowing teachers to design interactive worksheets and instructional materials tailored to different learning styles, promoting creativity, collaboration, and an enhanced educational experience.
Quizlet	The online learning platform allows students of all ages to create, study, and share digital flashcards, quizzes, and study guides, promoting effective memorization and review of educational content in a variety of subjects while encouraging active engagement, retention, and mastery of information.	The possibility of relying on memorization rather than deep understanding of the material, limited opportunities for critical thinking or the development of higher-order cognitive skills, and the risk of inaccuracies or incomplete information in user-generated content on the platform.	Quizlet receives positive student feedback for its user-friendly interface, extensive collection of study materials, and interactive features that promote effective learning, making it a popular choice among students for studying and preparing for exams.	Quizlet's flashcards, quizzes, and study games can be used in the classroom to help students review and reinforce key concepts, vocabulary, and information, promoting active learning and retention.
Spinner Game	The Spinner Game is a fun and versatile activity that involves spinning a wheel or virtual spinner to determine the outcome. It is ideal for icebreakers, team-building exercises, and educational activities because it encourages decision-making, chance-based	Its reliance on chance may result in unequal opportunities for players and may jeopardize skill-based learning or decision-making. Furthermore, using the spinner repeatedly can reduce engagement	The Spinner Game is entertaining and enjoyable because it adds a fun and unpredictable element to the learning process, making it an effective tool for reinforcing concepts and encouraging active participation.	Incorporating the Spinner Game into classroom instruction provides an interactive and stimulating method of reinforcing diverse educational principles, such as math operations, vocabulary, and critical thinking skills, by engaging students in

	scenarios, and generates discussion prompts.	and novelty, making the game less appealing over time.		learning activities and discussions based on the outcomes of the wheel spin, fostering active participation and improving knowledge retention.
QR code	QR codes in education facilitate access to digital resources such as websites, videos, documents, and quizzes via simple smartphone or tablet scans, fostering engagement and facilitating the integration of physical and digital learning environments while also serving as a valuable tool for classroom management tasks such as attendance tracking, material organization, and information sharing with students and parents.	Students' reliance on smartphones or devices with QR code scanning capabilities can limit their accessibility and usage in environments where these devices are not easily accessible or permitted, and the potential vulnerability of QR codes to malicious activities emphasizes the importance of exercising caution when scanning unfamiliar codes.	Students generally appreciate the convenience and ease of use that QR codes provide, allowing them to quickly access information or resources with their smartphones.	QR codes are a versatile way of incorporating technology into the classroom, allowing quick access to supplementary digital content, interactive activities, and resources, fostering student engagement and self-directed learning, and facilitating information sharing among students and teachers, promoting collaboration and feedback in a technology-driven learning environment.
Kahoot	Kahoot is an interactive learning platform that allows teachers to create engaging quizzes, surveys, and discussions, while students actively participate by answering questions on their devices, to make learning more enjoyable, encouraging active engagement, and assessing student knowledge through gamified and interactive methods.	Its reliance on a competitive format, which may put some students under pressure and cause anxiety, and its limited scope in assessing deeper understanding or critical thinking skills, as it primarily focuses on quick recall and response-based quizzes.	Students often provide positive feedback about Kahoot, praising its interactive and gamified nature that makes learning fun and engaging, while also appreciating its ability to assess their knowledge and promote healthy competition among peers, resulting in increased participation and motivation in the classroom.	Integrating Kahoot into classroom learning fosters an engaging and interactive environment through formative assessments, quizzes, and review sessions, enabling teachers to assess comprehension, encourage participation, offer prompt feedback, and enhance knowledge retention, while its gamified features promote student engagement, healthy competition, and an enjoyable learning experience.
Jeopardy Lab	Jeopardy Lab is an interactive web-based platform that enhances education by enabling teachers and students to create and play engaging Jeopardy-style games, facilitating active participation, knowledge review, and reinforcement across different subjects and categories.	Jeopardy Lab's constrained customization options and predefined game format may not fully align with specific educational objectives, while its limited tracking features pose challenges for teachers in assessing individual student progress and performance accurately.	Students generally find Jeopardy Lab to be a fun and engaging educational tool, as it allows them to test their knowledge, compete with their peers, and reinforce learning through interactive game-based activities; however, some students may find the format repetitive or overwhelming if not adequately varied or properly aligned with their learning objectives.	Jeopardy Lab can be integrated with classroom learning as a fun and interactive way to review and reinforce academic content, allowing students to actively participate in a competitive game format that promotes knowledge retention, critical thinking, and collaboration, making learning engaging and enjoyable.

Animaker	The online platform offers a user-friendly interface and a diverse selection of pre-built templates, characters, and animations, empowering individuals and businesses to effortlessly produce captivating animated videos, infographics, and presentations for educational, marketing, and entertainment purposes.	Limited customization options compared to professional animation software, a potential learning curve for complex features, and the reliance on internet connectivity for online access, which may limit usability in offline environments.	The intuitive interface, diverse animation options, and customizable templates make Animaker a popular choice among students for multimedia projects and assignments.	The integration of Animaker in classroom learning fosters students' creativity, critical thinking, and communication skills through the creation of animated videos, presentations, and storytelling projects, while also providing teachers with an interactive platform to deliver content, explain complex concepts, and facilitate engaging discussions, resulting in increased student participation and understanding.
Visme	This versatile online tool empowers users to create visually appealing and interactive content, including presentations, infographics, reports, and interactive materials, facilitating effective communication of complex information, data, and ideas in various contexts such as education, marketing, and professional presentations.	Visme may have certain drawbacks, including a higher learning curve than simpler presentation tools, limited customization options for advanced users seeking intricate design elements, and the requirement of an internet connection for accessing and editing projects.	Students value Visme for its user-friendly interface, wide range of templates and assets, and its capacity to generate captivating and interactive presentations and infographics, enhancing the visual appeal and effectiveness of their learning experience, while the collaboration features enable effortless teamwork and content development for group projects.	Visme facilitates classroom integration by empowering students to create interactive and visually captivating multimedia content, such as presentations, infographics, and reports, fostering active engagement, creativity, and effective communication, while its collaboration features enable teachers to facilitate group projects, encourage teamwork, and offer personalized feedback, enhancing the overall learning experience.
Google Expeditions	An immersive educational platform that allows teachers to take their students on virtual field trips to various locations around the world. Its purpose is to enhance learning experiences by providing students with 360-degree panoramic views and guided information, making learning engaging and interactive.	It's a limited content library, which may not offer a comprehensive range of educational experiences for all subjects or grade levels.	The Google Expedition is an immersive and engaging learning experience that allows us to explore various destinations and historical landmarks from the comfort of our classroom.	The integration of Google Expedition with classroom learning enriches students' educational experiences through immersive virtual reality (VR) field trips, allowing them to explore different locations, historical landmarks, and scientific concepts, leading to more engaging and interactive learning while enabling educators to create dynamic lessons that stimulate curiosity, facilitate discussions, and enhance students' comprehension of diverse subjects.
AR applications				

AR Flashcards	Interactive learning tools combining augmented reality technology and traditional flashcards provide students with immersive educational experiences, enhancing subject retention and comprehension through visually engaging and interactive presentations, resulting in more enjoyable and effective learning.	Students may rely too heavily on the technology and become less engaged with traditional learning methods, potentially hindering their overall learning experience.	The AR Flashcards provided an engaging and interactive learning experience, making it easier to grasp complex concepts and retain information.	The integration of AR flashcards with classroom learning enhances the educational experience by providing interactive and immersive content that engages students and promotes active participation in the learning process. It combines traditional learning materials with augmented reality technology, creating a dynamic and effective learning environment.
Metaverse	The virtual universe combines augmented reality (AR), virtual reality (VR), and the internet into an interconnected digital realm, enabling real-time interactions and creating an immersive space for socializing, working, learning, gaming, and exploring, transforming the way individuals engage with technology and interact with one another.	One drawback of the metaverse is the potential for increased social isolation and disconnection from the physical world as people immerse themselves in virtual environments.	The Metaverse has revolutionized our learning experience by creating an immersive and interactive environment where we can engage with course material and collaborate with peers in real-time.	The integration of the Metaverse in classroom learning empowers students to actively participate in immersive and interactive educational experiences, allowing them to explore virtual environments and simulations, enhance their understanding of various subjects, foster collaboration, personalize learning, and develop digital literacy skills to thrive in an ever-changing world.
Aurasma	The augmented reality platform enables users to create and interact with interactive digital content in real-world settings using mobile devices, enhancing their perception of the physical environment through the overlay of virtual information in the form of images, videos, and animations on the live camera view, offering an immersive and engaging experience.	Aurasma's interface can be complex and may require a learning curve for users unfamiliar with augmented reality technology.	Aurasma is an incredible AR tool that enhanced our learning experience by bringing static images and objects to life, making the content more engaging and interactive. It allowed us to explore concepts in a visually captivating way, which greatly enriched our understanding and made the learning process enjoyable.	The integration of Aurasma into classroom learning boosts student engagement through interactive augmented reality content, providing supplementary materials like videos, 3D models, and interactive quizzes that enhance lessons and make abstract concepts more tangible and engaging.
Storyfab	The innovative storytelling platform offers a user-friendly interface and a diverse set of tools, enabling users to create immersive and interactive narratives enhanced with multimedia elements, thereby stimulating creativity and captivating audiences through dynamic storytelling.	It has limited customization options, as users may feel restricted in fully expressing their creative vision.	Storyfab has greatly enhanced our creativity and engagement in the classroom. Its user-friendly interface and wide range of interactive features have made learning an enjoyable and immersive experience.	By incorporating Storyfab into classroom instruction, students are afforded a dynamic and immersive learning environment where they can construct and navigate interactive narratives, resulting in heightened creativity, critical thinking, and collaboration skills, as well as increased engagement and a stronger affinity for the academic content.

A typology of assignments for creating digital content was proposed based on the information in Table 1 and our previous research work. These tasks are based on various communication spheres, topics, and subtopics, such as sociocultural, educational, and professional spheres (See figures 2, 3, 4, 5). The typology focuses on professional and communicative situations, and it includes task construction stages as well as exercise systems. Multilingual multimedia materials and web-based interactive tasks are among the tasks. Real-world sources included magazine articles from Learnenglishteens.britishcouncil.org and newspaper articles from VOA, BBC, New York Times, Washington Post, and The Guardian. The assignments also require students to analyze and present professional case studies using interactive programs (Zhubanova et al., 2020).

Figure 2

Canva app for creating immersive and interactive experiences

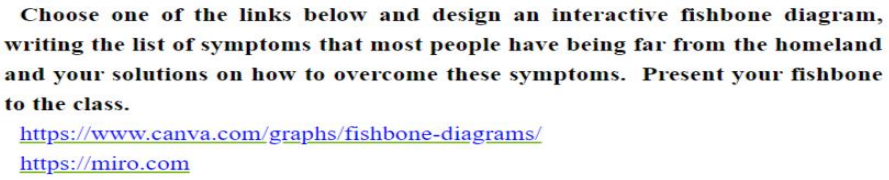


Figure 3

QR code for accessing and exploring virtual content

Scan the QR code and watch the video. Put in order the following five UNESCO World Heritage Sites:

1. Western Tien-Shan
2. Mausoleum of Khoja Ahmed Yasawi
3. Silk Roads
4. Saryarka Steppe and Lakes of Northern Kazakhstan
5. Petroglyphs of Tamgaly

Match the pictures (a-e) with their descriptions (1-5) below:

a._____

b._____

c._____

d._____

e._____

1. The Mausoleum of Khoja Ahmed Yasawi, in the town of Yasi, now Turkestan, was built at the time of Timur (Tamerlane), from 1389 to 1405. In this partly unfinished building, Persian master builders experimented with architectural and structural solutions later used in the construction of Samarkand, the capital of the Timurid Empire. Today, it is one of the largest and best-preserved constructions of the Timurid period.

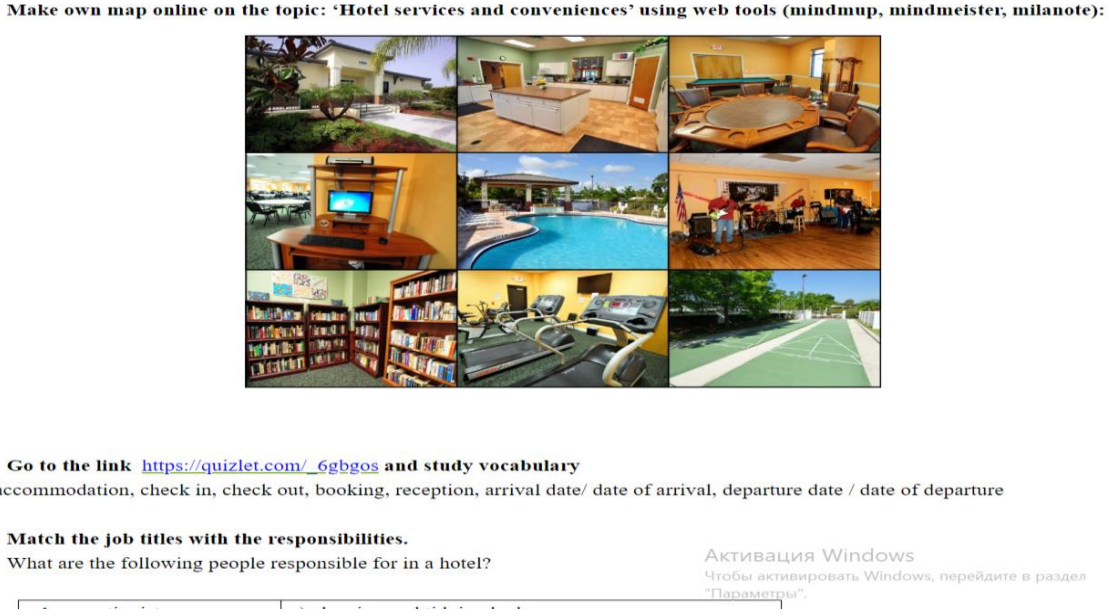
2. The transnational property is located in the Tien-Shan mountain system, one of the largest mountain ranges in the world. Western Tien-Shan ranges in altitude from 700 to 4,503 m. It features diverse landscapes, which are home to exceptionally rich biodiversity. It is of global importance as a centre of origin for a number of cultivated fruit crops and is home to a great diversity of forest types and unique plant community associations.

3. Tamgaly Tas means "a rock illustrated with the symbol of a tribe". Tamgaly is a valley, with black flint rock jutting out on both sides. It's excellent carving material. The site is extensive, consisting of 7 big spots housing several thousands of petroglyphs. The majority of them are from the Bronze Age, depicting animals, hunting scenes and fertility rituals involving men and goats. Of special significance are the sun deities, with a radiant head, which appear in several places, especially near the spiritual heart of Tamgaly on the western side of the valley, where scenes of dancing and revelry abound.

4. The Silk Road was a network of trade routes, which connected the East and West, and was central to the economic, cultural, political, and religious interactions between regions from the 2nd century to the 18th century. The Silk Road primarily refers to the land routes connecting East Asia and Southeast Asia with South Asia, Persia, the Arabian Peninsula, East Africa and Southern Europe.

Figure 4

The Quizlet app for exploring virtual spaces and interacting with virtual representations of the learning materials



Make own map online on the topic: 'Hotel services and conveniences' using web tools (mindmup, mindmeister, milanote):

Go to the link https://quizlet.com/_6gbgos **and study vocabulary**

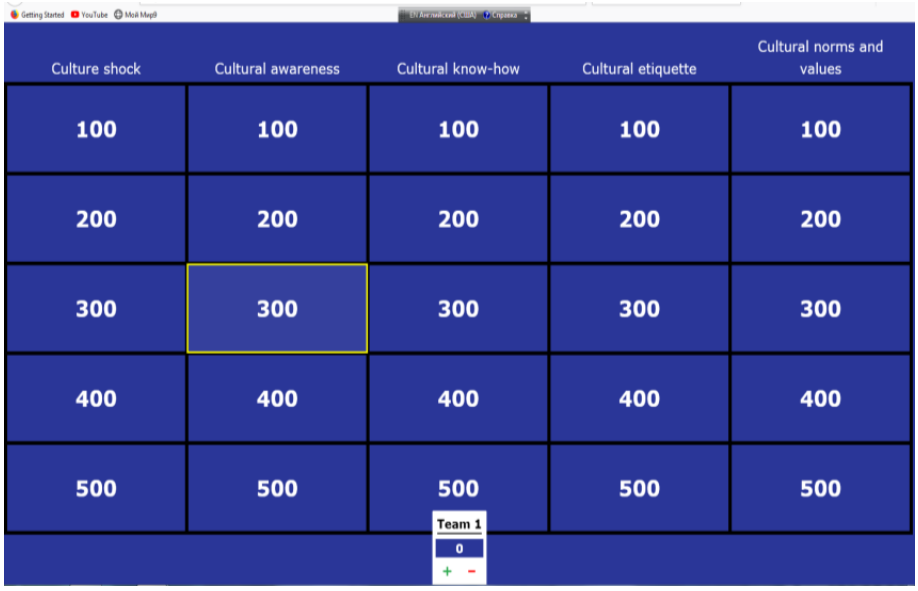
accommodation, check in, check out, booking, reception, arrival date/ date of arrival, departure date / date of departure

Match the job titles with the responsibilities.

What are the following people responsible for in a hotel?

Figure 5

JeopardyLab for creating, editing, and sharing game boards



The impact of AR and VR activities on motivation and involvement was revealed through qualitative observations of student engagement during AR and VR activities. Enthusiasm, active participation, and interest were among the observations. Immersive experiences, interactive elements, and novelty were identified as engaging factors in the analysis. This study shed light on the effectiveness of augmented reality and virtual reality in increasing motivation and involvement in language learning.

4. DISCUSSION

The findings of the present study align closely with prior research that positions AR and VR as transformative tools in language learning, offering immersive, interactive, and highly engaging educational experiences. Consistent with Bonner and Reinders (2018) and Al-Ansi et al. (2023), the results confirmed that both technologies enhance student motivation and engagement, though they do so through distinct mechanisms: AR primarily by augmenting real-world contexts with digital elements, and VR by creating fully immersive simulated environments. In the current study, AR was particularly effective in fostering language use beyond the classroom, corroborating earlier observations by Wedyan et al. (2022) and Magaña et al. (2025) that AR-supported activities improve vocabulary acquisition, reading comprehension, and learner motivation through interactive mobile applications and educational games.

The positive impact of AR on vocabulary and reading skills observed in our study mirrors the outcomes reported by Jamrus and Razali (2019) and Salehi (2025), who also found that AR-based activities combining animation and sound led to measurable gains in learner motivation and performance. Similarly, Su et al. (2022) demonstrated that AR, when embedded in interdisciplinary frameworks like STEAM, heightens enjoyment and curiosity, effects that were also evident in the qualitative feedback from our participants. However, while earlier studies (Karacan & Akoğlu, 2021) stressed the need for more empirical evidence in AR-enhanced language teaching, our results add to this limited but growing body of research by offering context-specific insights from a Kazakhstani higher education setting.

In relation to VR, our findings strongly corroborate McCurrach (2020) and Xie et al. (2022), who emphasized VR's ability to enhance speaking, listening, pronunciation, and cultural awareness through immersive, context-rich simulations. Participants in our study reported that VR facilitated deeper emotional and cognitive connections to language-learning content, a result consistent with the experiential learning benefits outlined by Halabi (2020) and Carbonell-Carrera et al. (2021). Moreover, the observed improvements in learner engagement align with the motivational gains reported by Zhubanova et al. (2018), who highlighted VR's capacity for fostering communicative interaction and self-directed learning.

An interesting parallel emerged between our findings and studies outside the direct domain of language learning. For example, Samadbeik et al. (2018) in medical education and Halabi (2020) in engineering education identified VR's value in providing safe, realistic practice environments, an attribute mirrored in our language-learning simulations, which allowed students to experiment linguistically without the fear of real-world repercussions. This cross-disciplinary consistency suggests that VR's immersive affordances are broadly transferable across learning domains.

Despite these areas of corroboration, our results diverge from certain emphases in the literature. While Bonner and Reinders (2018) and Fitria (2023) note that AR applications in education have remained relatively limited compared to entertainment uses, our findings indicate a more active adoption in the studied context, especially in mobile-assisted language learning. Furthermore, although Karacan and Akoğlu (2021) underscore the need to define technical boundaries for AR in education, our study found that even loosely structured AR activities could yield significant motivational and linguistic benefits, suggesting flexibility in implementation may be advantageous in certain contexts.

The study also contributes to the ongoing debate on whether AR or VR offers superior language-learning benefits. Consistent with Cevikbas et al. (2023), our data suggest that the technologies are complementary rather than competing. AR's strength lies in contextual augmentation and real-world integration, while VR excels at cultural immersion and high-stakes communication practice. When applied in combination, as in the blended approach used in our study, the two modalities can produce synergistic effects, enriching both engagement and comprehension.

In sum, the results reaffirm the central claims in the literature that AR and VR can significantly improve language proficiency, learner motivation, and cultural understanding while extending these findings into a Kazakhstani university setting. The evidence supports a strategic, complementary deployment of AR and VR in language curricula, with flexibility in design and application to match institutional resources and learner needs.

5. CONCLUSION

The incorporation of Augmented Reality (AR) and Virtual Reality (VR) techniques in language learning demonstrates considerable potential for transforming educational practices. A review of the literature and experimental research conducted in universities in Kazakhstan indicates that AR and VR exert a positive influence on language learning. These techniques enhance motivation, encourage language use beyond the classroom, improve reading skills, facilitate deeper engagement with classroom topics, and provide immersive learning environments.

Empirical findings reveal that AR and VR contribute to significant improvements in student learning outcomes, with experimental groups demonstrating higher language proficiency compared to control groups. The diverse activities integrated into the research highlight the capacity of AR and VR to promote authentic language use, strengthen comprehension, support vocabulary acquisition, enhance pronunciation practice, foster collaboration, and deepen cultural understanding. These results carry important implications for educators, policymakers, and practitioners, underscoring the importance of incorporating AR and VR into English language education to increase learner engagement and prepare students for a technology-oriented future. Continued investigation is necessary to evaluate the effectiveness of these techniques across different dimensions of language learning and to address associated technical challenges.

6. RECOMMENDATIONS

Several recommendations can be made based on the findings of this study for the integration of AR and VR techniques in language learning at Kazakh-British Technical University (KBTU) and other educational institutions:

- Professional Development and Training: Educators should be given training and opportunities for professional development to become acquainted with AR and VR technologies and their pedagogical

applications. This will allow them to effectively integrate these technologies into their language instruction and provide students with immersive and engaging learning experiences.

- Best Practices Collaboration and Sharing: Educators should collaborate and share best practices for using AR and VR technologies in language instruction. Workshops, conferences, and online platforms where educators can exchange ideas, resources, and lesson plans can help with this. Collaboration will foster innovation and continuous improvement of AR and VR language learning techniques.
- Access to AR and VR Technologies: Educational institutions should provide students with access to AR and VR technologies to ensure that all learners have equal opportunities. This can be accomplished by creating dedicated AR and VR labs or by providing students with mobile devices or headsets that support these technologies.
- Research and Development: Ongoing research and development in the field of AR and VR in language learning is required to fully explore the potential of these technologies. Researchers should investigate the effectiveness of various AR and VR applications, their impact on various language skills, and the best practices for integrating these technologies into language instruction.
- Assessment and evaluation: More research is needed to develop valid and reliable assessment tools for evaluating language proficiency in AR and VR environments. This will allow educators to assess the effectiveness of AR and VR techniques in language learning and make data-driven decisions about instructional practices.

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