

# The Role of Virtual and Augmented Reality in Young Learners' Motivation in English Learning

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## **Abstract**

This article investigates the role of virtual reality (VR) and augmented reality (AR) in the motivation of young learners (YLS) to learn English. This study is based on Self-Determination Theory (SDT) by Deci and Ryan and Gardner's socio-educational model. This investigation aimed to explore the implementation of VR and AR in primary school English learning, examine their impact on learners' motivation, identify their advantages and challenges, analyze teacher feedback methods and students' perceptions, and gather student suggestions for improving VR and AR use in lessons. This descriptive quantitative study employed a questionnaire to gather information from 139 primary school learners. Data were analyzed using descriptive quantitative analysis. The result showed that the use of VR and AR boosted the motivation of YLS. This study revealed the benefits and challenges of using VR and AR, the perspectives of YLS on feedback, and some proposed suggestions to improve the implementation of VR and AR from the perspectives of YLS.

**Keywords:** Virtual reality, augmented reality, young learners, motivation, learning, English

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## 10.1 Introduction

The use of VR and AR has been implemented in learning English. These technologies provide new experiences for learners learning English. Most research has been done on implementing VR and AR with adult learners. However, some research has been conducted in young English language learners' classes. In addition, motivation plays a central role in learning English as a Foreign Language (EFL). Some studies on the motivation of YLs using VR and AR are based on the attention, relevance, confidence, and satisfaction (ARCS) theory [1–3]. However, there is no investigation on the impacts of VR and AR on YLs' motivation to learn English based on the SDT theory and socio-educational model. Investigating the impact of implementing VR and AR on YLs' motivation, namely, intrinsic, extrinsic, and integrative, provides valuable insights. Therefore, this research intends to fill the gap by examining the impact of VR and AR on YLs' motivation in English learning.

This paper examines how YLs' motivation for learning English is affected by VR and AR, with a particular emphasis on how these immersive technologies might improve engagement and advance language acquisition. The unique approach to language learning brought about by the usage of VR and AR in teaching provides immersive and engaging surroundings that are sometimes absent from standard classroom techniques. By utilizing these tools, teachers may design engaging lessons that attract YLs' interest and keep their attention and motivation over time for a successful second language (L2) learning process.

The capacity of VR and AR to engage students through gamified learning experiences is one of the main motivating aspects addressed in the article. These technologies turn language learning from a tedious or difficult task into a pleasurable activity by adding aspects of play and competitiveness. YLs' intrinsic motivation is tapped into when game-like elements are included, such as virtual challenges, progress monitoring, and rewards, which increases their likelihood of actively and regularly participating in the learning process. For example, research showed that points, badges, and grading were used to motivate students [4]. Long-term motivation maintenance requires a more positive attitude about learning English, which is fostered by this sense of involvement.

The contextualized language practice that VR and AR offer is another important component that has been studied. YLs frequently have difficulty using the language in authentic contexts while studying it in standard language learning environments. Nevertheless, YLs may practice their English

in realistic, virtual environments that resemble real-world conversation situations by using VR and AR [5]. As a result, they can improve their vocabulary [6–8], grammar, and the ability to speak and write smoothly and spontaneously [9, 10] while also developing their language abilities in context. YLs may be required to utilize English in meaningful ways when completing activities such as navigating simulated locations like restaurants and interacting with virtual characters. Learning becomes more useful and relevant as a result of these contextualized experiences, which also boosts motivation.

The importance of immediate feedback methods in nurturing YLs' motivation is also covered in the paper. Both VR and AR provide immediate feedback on language proficiency, enabling YLs to make corrections and advance their abilities immediately [11]. YLs are encouraged to explore the language without fear of failing since they receive a prompt answer that validates their learning [9]. The immediate feedback loop motivates YLs to practice and improve their language skills by enhancing their confidence and offering them an achievement.

The paper discusses several issues despite the many benefits of VR and AR in language acquisition. Because not all schools and YLs have the means to deploy new technologies, and accessibility is still a major challenge. Additionally, there is a need for excellent, developmentally appropriate content that supports YLs' learning goals. The potential of VR and AR to drive YLs may not be fully realized in the absence of skillfully crafted content.

This investigation aimed to explore the implementation of VR and AR in primary school English learning, examine their impact on learners' motivation, identify their advantages and challenges, analyze teacher feedback methods and students' perceptions, and gather student suggestions for improving VR and AR use in lessons.

## 10.2 Literature Review

Motivation is defined as the enthusiastic alteration of collective excitement in a person that initiates, leads, enhances, and approximates the intellectual and motor improvements by which primary goals and wishes are chosen, underscored, implemented, and accomplished [12]. This study relied on Deci and Ryan's SDT, namely, intrinsic and extrinsic motivation, and Gardner's socio-educational model, integrative motivation. In general, two types of motivation are intrinsic and extrinsic [13–15]. Research revealed that those two types of motivations influence students' English

achievement [16]. Student motivation plays a crucial role in English learning. Furthermore, classroom activities and teachers' and peers' feedback shaped YLs' motivation to learn English.

Three types of motivation that have been detected in young language learners [17] include intrinsic motivation, extrinsic motivation [13], and integrative motivation [18]. Intrinsic motivation refers to the inherent enjoyment and satisfaction that learners derive from the learning process [13]. Extrinsic motivation refers to behaviors driven by external factors rather than by intrinsic satisfaction or enjoyment of the activity itself [13]. Integrative motivation is the attractiveness of learning a language to fit the culture of the target language and establish social interactions with its community [19].

Some studies have been conducted on the motivation of YLs related to the use of VR and AR in English language learning. Huang *et al.* [2] investigated VR and AR-based wearables based on the ARCS motivation model in a primary school in Taiwan. They found that learning performance was correlated with confidence and relevance. YLs' learning performance and the remembering subdimension were predicted by confidence. Some advantages of using VR-based wearables are that it is easier to generate an extremely immersive atmosphere of learning, help YLs learn the correct vocabulary, and improve YLs' precision, confidence, and accomplishment in learning [2]. Mahadzir [1] investigated the use of AR pop-up books and the ARCS model of motivational design. They found that the AR pop-up book effectively captured YLs' attention, making lessons relevant, boosting their confidence, and providing satisfaction from the learning experience. While most YLs showed high motivation, a couple of them exhibited a lack of interest in English and technology. Huang *et al.* [2] studied the AR video-enhanced learning (ARVEL) method's impact on YLs' EFL learning outcomes and motivation in elementary school, and they found that this method enhanced their satisfaction with EFL learning and increased the YLs' learning outcomes and intrinsic motivation.

Vidergo [20] investigated YLs' perceptions of the impacts of digital escape rooms in elementary schools. He conducted an experiment with elementary school students, creating an experimental group that learned through an online digital escape room and a control group that engaged with another digital game, such as jigsaw puzzles; the teacher monitored both groups online. In the control group, students were challenged to solve puzzles based on a story. They applied codes to open boxes at different stages, unlocked the last box, and solved the case in groups of five within 45 minutes. The results indicated that the gameful experience enhanced YLs' intrinsic and extrinsic motivation, while collaboration fostered playfulness

and completion in learning [20]. YLs preferred the digital escape room over other games [20]. Shortt *et al.* [21] revealed that Duolingo improves FL performance, engagement, and motivation; this application is also utilized with young learners in English language classes [22].

Using VR and AR also improves YLs' language skills. Lai *et al.* [23] showed that online role-playing at elementary school games an online role-playing game reduced the learners' English-speaking anxiety and enhanced their motivation and confidence. Most YLs were absorbed in speaking tasks and showed more self-reliance. Teachers agreed that this game impacts English speaking ability and could be employed at home to learn independently and integrate into teaching in EFL classes. Suh *et al.* [10] studied the use of massive multiplayer online role-playing game (MMORPG)-based instruction in learning English at elementary schools, and they found that YLs' listening, reading, and writing scores were higher using MMORPG than traditional instruction. Aldossari *et al.* [9] studied the influence of employing AR on evolving language learning. The results showed that the implementation of AR improved learners' EFL learning considerably. Teachers reported that AR allowed learning of vital skills better, enhanced YLs' motivation and positive attitudes, and nurtured learners' independence. Liao *et al.* [3] examined the impacts of AR game-based learning on YLs' English learning motivation and performance in the city and countryside. They found that StemUp improved English performance and motivation significantly in those groups. This application improved YLs' vocabulary, speaking, listening, engagement, and motivation in English learning.

Research has been conducted on employing VR and AR in learning vocabulary and motivation in elementary schools. Cerezo *et al.* [24] examined the impact of a holographic mobile-based application on YLs' pronunciation and motivation. They found that the application impacted YLs' motivation significantly and enhanced their performance. Andreani and Ying [25] developed an interactive game application, PowPow, for learning vocabulary at elementary schools in Indonesia. The results showed that YLs agreed that the game motivates them to learn and improve their vocabulary. Others investigated the effects of employing a 3D vocabulary learning program on YLs' vocabulary acquisition [7]. They found that virtual environments had a significant influence on facilitating vocabulary learning. Dalim *et al.* [26] compared using the AR tool, TeachAR, and the traditional method for teaching English words to YLs, and it showed that learning outcomes using TeachAR outperformed non-using TeachAR. It also showed that YLs liked using the AR tool. Chen *et al.* [8] designed a game-based learning system with augmented reality technology for

students in primary school and found that it improved YLs' motivation significantly and learning vocabulary effectively. Tsai [27] investigated YLs' motivation and performance in learning vocabulary through AR (3D animation and multimedia) in elementary schools in Taiwan and found that learners' motivation and performance using AR outperformed the traditional teaching method. They also identified opportunities such as being exciting, interesting, motivating, enhancing curiosity, and effective in understanding vocabulary. Sukmawati [28] examined the effectiveness of VR in learning English vocabulary for YLs at elementary school. The research was conducted with four primary school teachers and 60 primary school students. They found that VR was associated with significantly higher scores on vocabulary recall than 2D images. Using VR improved YLs' motivation [28].

Hsu [29] developed and compared AR educational game systems that relied on self-directed learning and task-based learning approaches. He revealed that YLs using the two game systems had the same and high learning efficiency, while those using the self-directed system indicated a higher flow experience. Nevertheless, the learners with a sequential style of learning had lesser emotional effort and FL learning fear.

Chang *et al.* [30] conducted experimental research using VR and voice-video-based oral communications. They found that VR can effectively enhance YLs' abilities to learn English compared to video. Chang *et al.* [30] revealed some advantages of using VR in YLs' English learning classes. First, VR increases student motivation and participation because it creates an immersive and interactive environment. Next, YLs' English learning outcomes are better using VR than traditional methods. Then, VR facilitates practical learning, allowing YLs to use knowledge in real contexts, VR promotes teamwork and problem-solving through collaborative virtual experiences, VR helps YLs grasp complex ideas through visual and interactive simulations, and VR is easy to use and beneficial, which encourages continued use in their learning process.

Sharaf *et al.* [5] revealed some advantages of VR in EFL learning: VR adjusts a various styles of learning, enhances comprehension and engagement, and offers learners realistic, real experiences while nurturing critical thinking, creativity, and social skills.

Some challenges in the implementation of AR and VR in an educational setting are some schools cannot afford the equipment, software, and hardware of VR and AR, and not all students have devices for using this technology at home lead to discrimination against students; this technology is new for both teachers and students, requiring training for them. Schools need to update regularly the content that aligns with the latest technology,

lack of standard assessment criteria for the impact of this technology on students' learning outcomes, and difficulty in implementing and maintaining VR and AR tools [31].

Some problems have been identified in implementing VR and AR technologies in elementary schools, including lack of competency; lack of time [5, 32]; limited environmental resources; limited instructional design; distraction to attention [27, 32]; technological barriers such as Internet connection, financial concerns, content creation challenges, and adaptation to VR technology [5]; addiction [5, 23]; difficulties in memorizing vocabulary [27]; a few usability issues with the AR tool [26]; and eye-sight problems [23, 27].

Teachers provide feedback in different ways to the learners when using VR and AR. Some provide feedback during VR sessions, addressing language errors as they occur, because this helps learners adjust their language use straightaway [11]. Others use assessments to evaluate comprehension and retention and provide insights into learners' progress [33]. Some give feedback on post-activity discussions to provide feedback on performance, clarify doubts, and reinforce learning objectives [33]. Some AR applications provide automated feedback through notifications or prompts during language exercises [9]. Some teachers review tasks completed within AR platforms and offer written comments [34]. Teachers sometimes provide oral feedback, address errors, and offer guidance to enhance language proficiency during AR-integrated lessons [35].

Learners perceived teachers' feedback differently during English lessons using VR and AR. Some believe that immediate and contextual feedback can improve comprehension and retention [36]. Some revealed that feedback is somewhat useful, which means that VR or AR do not fully replace traditional teaching methods or address every student's unique challenges [37]. Some feedback is not helpful for the learners because of a lack of personalized feedback [38].

### 10.3 Objectives of the Research

The objectives of the research were as follows:

1. Explore the methods and practices used in the implementation of VR and AR technologies in English language learning for primary school students.
2. Investigate the effects of VR and AR on young learners' motivation to learn English.

3. Find out the advantages of the use of VR and AR in English lessons.
4. Identify the challenges that young learners face when using VR and AR in English lessons.
5. Explore how teachers provide feedback to young learners in the context of VR and AR-based English lessons.
6. Investigate how young learners perceive feedback from their teachers in the context of VR and AR-based English lessons.
7. Collect suggestions that young learners propose for improving the implementation of VR and AR in English lessons.

## 10.4 Research Questions

The research questions were as follows:

**RQ<sub>1</sub>:** How are VR and AR being implemented in English learning for primary school students?

**RQ<sub>2</sub>:** What are the effects of VR and AR on young learners' motivation to learn English?

**RQ<sub>3</sub>:** What are the advantages of the use of VR and AR in English lessons?

**RQ<sub>4</sub>:** What challenges do young learners encounter when using VR and AR in English lessons?

**RQ<sub>5</sub>:** How do teachers provide feedback to young learners in the context of VR and AR-based English lessons?

**RQ<sub>6</sub>:** How do young learners perceive feedback from their teachers in the context of VR and AR-based English lessons?

**RQ<sub>7</sub>:** What suggestions do young learners propose for improving the implementation of VR and AR in English lessons?

## 10.5 Methodology

This was a descriptive quantitative study aimed at describing the implementation of VR and AR in primary school English learning, examining their impact on learners' motivation, identifying their advantages and challenges, analyzing teacher feedback methods and students' perceptions, and gathering student suggestions for improving VR and AR use in English lessons.

**Table 10.1** Description of participants in the study.

	Gender		Type school		Grade level					
	Male	Female	Public	Private	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>
Number (%)	59 (42.4)	80 (57.6)	117 (84.2)	22 (15.8)	2 (1.4)	12 (8.6)	5 (3.6)	35 (25.2)	47 (33.8)	38 (27.3)

### 10.5.1 Population

The population in this study was students in Indonesian elementary schools who had learned English using AR and VR applications.

### 10.5.2 Sample and Sampling Procedure

A convenience sampling technique was used in this study, and 139 young learners participated in this research. The description of the sample of the study is presented in Table 10.1.

### 10.5.3 Instrument

A questionnaire was utilized to gather the data for this research. The questionnaire consisted of personal information, general information, motivation (intrinsic, extrinsic, and integrative motivation), advantages,

**Table 10.2** Description of the questionnaire.

Section	Description	Item	Total
Personal information	Gender, type of schools, grade level		3
General information	Frequently using VR or AR	1	1
	The most favorite tools	2, 3	2
	The most motivated activity	4, 5	2
Motivation	Intrinsic	1, 3, 7, 9, 11, 13, 15, 18	8
	Extrinsic	2, 8, 10, 12, 14, 19, 20	7
	Integrative	4, 5, 6, 16, 17	5
Advantages and problems	Advantages of VR and AR	1, 2	2
	Problems, challenges	3, 4	2
Feedback	Providing feedback and usefulness	5, 6, 7	3
Suggestion	Suggestion for improvement		1
<b>Total</b>			<b>36</b>

problems, and challenges in using VR and AR, feedback, and suggestions for improving the implementation of VR and AR in English learning.

The question types in the questionnaire were closed-ended questions, multiple-choice questions, 4 Likert scale statements, and an open-ended question. This online questionnaire was distributed to samples *via* WhatsApp on Google Forms with the help of teachers and parents. Table 10.2 describes the description of the questionnaire.

#### 10.5.4 Data Analysis

Data were analyzed using descriptive quantitative analysis in percentages and frequency.

### 10.6 Results and Discussion

**RQ<sub>1</sub>:** How are VR and AR being implemented in English learning for primary school students?

The results of this study revealed that 57 or 41% of young learners reported that they sometimes learn English using AR or VR, 53 or 38.1% reported rarely, 24 or 17.3% were often, and only 5 or 3.6% said very often. It seems that not many teachers implement or use AR or VR tools in their English classes. It is because of the limited facilities in their schools and teachers' readiness to integrate technology into their teaching, as they do not have enough knowledge to use this technology. Some schools do not have enough budget to train teachers and provide the AR and VR tools for their students. Some challenges in implementing VR in their classrooms included time limits, technological obstacles, the need for training, content challenges, student adaptation to VR, and financial problems [5].

VR tools that young learners enjoy using the most were VR role-playing games (50 or 36%), virtual games (41 or 29.5%), VR field trips, and VR simulation activities share the same number (23 or 16.5%), Duolingo (1 or 0.7%), and others (1 or 0.7%). Some studies showed that some VR applications or tools are used in learning English by elementary school students, namely, VR role-playing games [23], VR animation [28], virtual games such as MMORPG [10], Duolingo [21, 22], and VR for field trips [39]. It seems that games are the most preferred tool to use in YL English class it is because children like to play games, and integrating VR games into their English learning makes them enjoy learning. Games play an important role in the YL English class [40].

AR tools that young learners enjoy using the most were English educational games (46 or 33.1%), AR vocabulary games (42 or 30.2%), AR storytelling apps (28 or 21.1%), AR flashcards (23 or 16.5%), AR-based storybooks (14 or 10.1%), and English educational films (1 or 0.7%). Research showed that YLs enjoyed using AR-based methods [26]. Some AR tools that students like to use in learning English at elementary schools are educational games [40], vocabulary games [8, 25], and AR 3D animation and multimedia [27].

Activities in VR lessons that motivate young learners the most are immersive games and simulations (72 or 51.8%), vocabulary exploration in virtual worlds and role-playing in virtual environments share the same numbers (25 or 18%), and virtual storytelling (7 or 12.2%). 3D vocabulary learning programs had a significant influence on facilitating vocabulary learning [7]. Research showed that the gameful experience increased YLs' intrinsic and extrinsic motivation [20], and most YLs were immersed in speaking activities using online role-playing games [23].

Activities in AR lessons that motivate young learners the most are games and puzzles (77 or 55.4%), vocabulary practice (29 or 20.9%), storytelling (27 or 19.4%), interactive flashcards (5 or 3.6%), and others (1 or 0.7%). Some studies revealed that some activities used in young learners' AR lessons involved games [40, 41] and digital storytelling [40, 42, 43]. Learning activities that motivated YLs, both using VR and AR, are games because YLs like fun and enjoyable activities.

**RQ<sub>2</sub>:** What are the effects of VR and AR on young learners' motivation to learn English?

Table 10.3 presents YLs' self-reports about their motivation to learn English using VR and AR. Regarding YLs' motivation in using VR and AR in English lessons was classified into three groups: intrinsic motivation, extrinsic motivation [13], and integrative motivation [18].

### **Intrinsic motivation**

The results of this study showed that most YLs agreed that they feel more focused in English lessons when using VR, they enjoy visiting virtual places (e.g., parks, cities) in VR to learn English, they like solving tasks or puzzles in VR games related to English lessons, and VR makes it fun to learn English grammar and sentence structure. Some others strongly agreed, and only a few disagreed and strongly disagreed (see Table 10.3 for more details). Learners liked VR for field trips [39]. VR promotes problem-solving through collaborative virtual experiences [30].

Table 10.3 also shows that most of the YLs agreed that they enjoy learning English using AR tools like flashcards or interactive books, they feel excited to participate in English lessons using AR tools, they are more curious to explore English topics with AR animations or games, and using AR tools makes learning English fun and interesting. Some others strongly agreed, and only a few disagreed and strongly disagreed. These results align with Tsai's [27] and Chen *et al.*'s [8] studies that found that YLs were excited and curious about learning English using the AR tool and making learning fun.

### **Extrinsic motivation**

This study also revealed that most learners agreed that VR helps them understand English words and sentences better. VR encourages them to participate actively in class discussions; they are motivated to practice English at home after using VR in class. AR makes learning English vocabulary easier for them, AR helps them remember new English words better than regular lessons, they are motivated to complete English tasks when AR tools are involved, and AR tools inspire them to learn English outside of school. Less than half of the learners strongly agreed with those statements, and only a few disagreed and strongly disagreed (see Table 10.3).

Interactive game applications improve YLs' vocabulary [25], such as the AR tool, TeachAR, for learning vocabulary [26]. 3D vocabulary learning or virtual environments had a significant influence on facilitating vocabulary learning [7].

These findings align with former research that found that using AR motivates YLs to learn vocabulary and makes their vocabulary learning interesting and easy to understand the new vocabulary compared with traditional lessons [8, 27, 28]. VR made YLs participate actively in learning [28]; it was used by the learners after class and improved their motivation [23].

### **Integrative motivation**

Table 10.3 presents that learners agreed that VR motivates them to speak English with their classmates, they are more confident expressing themselves in English when using VR, and VR makes imagining and practicing real-life conversations in English easier. AR makes it easier for them to understand English stories and characters, and they feel confident using AR apps for English practice. Less than half of the respondents strongly agreed, and only a few disagreed and strongly disagreed. This finding aligns with the previous research that using VR boosted YLs' motivation [30]. VR and AR increased learners' confidence [23, 30, 41]. VR helps YLs grasp complex ideas through visual and interactive simulations [30].

**Table 10.3** Description of YLs responses.

Statements	Number of responses			
	Strongly disagree	Disagree	Agree	Strongly agree
1. I feel more focused in English lessons when using VR	2 (1.4%)	8 (5.8%)	90 (64.7%)	39 (28.1%)
2. VR helps me understand English words and sentences better.	3 (2.2%)	7 (5%)	92 (66.2%)	37 (26.6%)
3. I enjoy visiting virtual places (e.g., parks, cities) in VR to learn English.	1 (0.7%)	10 (7.2%)	97 (56.8%)	49 (35.3%)
4. VR motivates me to speak English with my classmates.	3 (2.2%)	14 (10.1%)	81 (58.3%)	41 (29.5%)
5. I am more confident expressing myself in English when using VR.	6 (4.3%)	15 (10.8%)	87 (62.6%)	31 (22.3%)
6. VR makes imagining and practicing real-life conversations in English easier.	5 (3.6%)	9 (6.5%)	86 (61.9%)	39 (28.1%)
7. I like solving tasks or puzzles in VR games related to English lessons.	3 (2.2%)	16 (11.5%)	76 (54.7%)	44 (31.7%)
8. VR encourages me to participate actively in class discussions.	2 (1.4%)	9 (6.5%)	93 (66.9%)	35 (25.2%)

*(Continued)*

**Table 10.3** Description of YLs responses. (*Continued*)

Statements	Number of responses			
	Strongly disagree	Disagree	Agree	Strongly agree
9. VR makes it fun to learn English grammar and sentence structure.	1 (0.7%)	7 (5%)	89 (64%)	42 (40.2%)
10. I am motivated to practice English at home after using VR in class.	2 (1.4%)	16 (11.5%)	81 (58.3%)	40 (28.8%)
11. I enjoy learning English using AR tools like flashcards or interactive books.	4 (2.9%)	8 (5.8%)	97 (69.8%)	30 (21.6%)
12. AR makes learning English vocabulary easier for me.	1 (0.7%)	9 (6.5%)	86 (61.9%)	43 (30.9%)
13. I feel excited to participate in English lessons using AR tools.	1 (0.7%)	8 (5.8%)	83 (59.7%)	47 (33.8%)
14. AR helps me remember new English words better than regular lessons.	0 (0%)	8 (5.8%)	93 (66.9%)	38 (27.3%)
15. I am more curious to explore English topics with AR animations or games.	1 (0.7%)	7 (5%)	86 (61.9%)	45 (32.4%)

*(Continued)*

**Table 10.3** Description of YLs responses. (*Continued*)

Statements	Number of responses			
	Strongly disagree	Disagree	Agree	Strongly agree
16. AR makes it easier for me to understand English stories and characters.	1 (0.7%)	11 (7.9%)	86 (61.9%)	41 (29.5%)
17. I feel confident using AR apps for English practice.	0 (0%)	8 (5.8%)	90 (64.7%)	41 (29.5%)
18. Using AR tools makes learning English fun and interesting.	2 (1.4%)	8 (5.8%)	87 (62.6%)	42 (30.2%)
19. I am motivated to complete English tasks when AR tools are involved.	2 (1.4%)	11 (7.9%)	88 (63.3%)	38 (27.3%)
20. AR tools inspire me to learn English outside of school.	2 (1.4%)	13 (9.4%)	88 (63.3%)	36 (25.9%)

**RQ<sub>3</sub>:** What are the advantages of the use of VR and AR in English lessons? This study showed some advantages of using VR in English lessons. About 105 (75.5%) of young learners reported that VR makes learning more engaging and fun. Chang *et al.* [30] also stated that VR increased student engagement. Others revealed that VR helps them better understand and remember vocabulary (69 or 49.6%). This aligns with the previous research that found that using VR made vocabulary learning easy to understand and memorize words [27].

About 66 (47.5%) young learners reported that they can learn English in an enjoyable, non-stressful way. Another advantage of using VR is that it allows students to practice English in real-world situations, as reported by 52 respondents (37.4%), and it makes learning more interactive and hands-on (42 or 30.2%). It supports previous research that VR facilitates applied learning, allowing learners to utilize knowledge in real contexts

[30], and gives students realistic, real-world experiences [5]. Forty-six students revealed that VR improved their confidence in speaking English (33.1%). This aligns with Lai *et al.*'s [23] study; it is because VR decreases YLs' speaking anxiety, and it also improves YLs' speaking ability. VR provides a more immersive experience than traditional learning (28 or 20.1%) and other (1 or 0.7%). Research showed that one of the advantages of VR is that it creates an immersive and interactive environment [30].

This study showed some benefits of using AR in English lessons. Young learners revealed that using AR makes learning more interactive and engaging (96 or 69.1%) and helps them understand vocabulary more visually (66 or 47.5%). These align with the previous research that found that learning using AR is interesting and effective for understanding vocabulary [3, 8, 27]. Young learners also noticed that using AR makes learning English more fun and enjoyable (64 or 46%). This is in line with the previous study [27]. Some revealed that using AR improves their speaking and listening skills (48 or 34.5%). This aligns with a study by Liao *et al.* [3] that AR improved YLs' speaking and listening skills. YLs said that using AR allows them to practice English in various real-life contexts (46 or 33.1%) and encourages them to participate more actively in class (44 or 31.7%). Thirty-five respondents reported that AR makes learning more personalized to their pace and needs (24.5%).

**RQ<sub>4</sub>:** What challenges do young learners encounter when using VR and AR in English lessons?

YLs experienced some difficulties using VR in English lessons. Most respondents reported that the VR experience is hard to understand (69 or 49.6%). This is because VR is new for students; they are still not able to use it because of a lack of training and find it difficult to understand. Research showed that one of the challenges of using this technology is that it requires special training for both teachers and students [31] and a lack of skill in using it [27]. Students felt dizzy or tired after using VR (63 or 45.3%). Young learners experienced that the VR app does not work well on the device (57 or 41%). This aligns with previous studies that showed that there are some technical issues in implementing this technology in the classroom [31]. Others said they have trouble focusing on the lesson because the VR is distracting (36 or 25.9%). Internet connection was also a problem reported by young learners (3 or 2.1%). One respondent noted that the VR tool is heavy (1 or 0.7%). Previous research showed that Internet connection is one of the problems in using VR [5]. Only a few revealed that they did not have any difficulties when using VR in English lessons (7 or 4.9%); it was because VR is easy to use and beneficial for learners [30].

Young learners also reported problems they face when using AR in their English lessons. They reported that they couldn't see the images or words clearly (73 or 52.5%), and the AR app was hard to use (65 or 46.8%). Young learners revealed that AR activities aren't fun or interesting (18 or 12.9%). A few learners reported problem-related Internet connection (3 or 2.1%) and others (2 or 1.4%). Five respondents stated that they did not experience any problems when using it (3.5%). Tsai [27] identified some challenges in using AR: difficulties in memorizing vocabulary, potential harm to eyesight, and distractions to attention. Alalwan *et al.* [32] found that obstacles in implementing VR and AR included scarcity of skill, restricted instructional design, dearth of focused concentration, shortage of time, and inadequate sources.

**RQ<sub>5</sub>:** How do teachers provide feedback to young learners in the context of VR and AR-based English lessons?

This study revealed the role of feedback in YLs' motivation in English learning. Most YLs reported that their teachers provided feedback through verbal instructions or corrections in the virtual environment (85 or 61.2%) when using VR for English practice. Teachers provide feedback during VR sessions, addressing language errors as they occur, because this helps learners adjust their language use straightaway [11]. Some others revealed that their teachers provided feedback through a follow-up assessment or quiz after the VR activity (72 or 51.8%). Teachers administer assessments to evaluate comprehension and retention. These assessments provide insights into learners' progress and areas needing improvement [33]. Others said during post-activity discussions (41 or 29.5%). It allows teachers to provide feedback on performance, clarify doubts, and reinforce learning objectives, and it can enhance understanding and retention [33]. Only one learner reported no feedback yet from their teachers (1 or 0.7%).

Teachers provided feedback to YLs when they used AR tools for English learning in different ways. Most of the learners reported that their teachers gave feedback through in-app notifications or guidance and written feedback on assignments or tasks (70 or 50.4% each). Some AR applications provide automated feedback through notifications or prompts during language exercises, supporting learners in immediate correction and learning [9]. The feedback from VR and AR allows YLs to make corrections and advance their abilities immediately. YLs are encouraged to explore the language without fear of failing since they receive a prompt answer that validates their learning. Some others said teachers gave verbal feedback during lessons (56 or 40.3%). Some teachers review tasks completed within AR

**Table 10.4** Suggestions for improving the implementation of AR/VR in learning English.

Emerging themes	Suggestion	Frequency
Accessibility and usability	Improving the application	15
	Frequently use	14
	Make it practical	5
	Don't use it frequently	2
	Learning to use it	2
	Need guidance	1
	More efficient	1
	Provided it for all students	1
Content quality and engagement	Better	8
	More fun	7
	Clear pictures	3
	More variative	2
	More interesting	2
	More sophisticated	1
	More games	1
Simplicity and clarity	Easy	5
	Clearer	4
	Simple	1
	Easy to understand	2
Feedback and involvement	Feedback from the teacher	1
	More student involved	1
	Easy to understand	2
Satisfaction	Nothing to improve	25
Others	Do not know	18
	No answer	15
<b>Total</b>		<b>139</b>

platforms and offer written comments, highlighting strengths and areas for improvement to guide students' progress [34]. Feedback motivates YLs to practice, improve their language skills, and enhance their confidence and achievement. One learner reported another (1 or 0.7%).

**RQ<sub>6</sub>:** How do young learners perceive feedback from their teachers in the context of VR and AR-based English lessons?

This study disclosed that feedback provided for YLs when using VR/AR apps in English lessons is fruitful. YLs reported that it is very helpful because it improves their understanding (94 or 67.6%). The interactive nature of VR/AR allows for immediate and contextual feedback, which can lead to improved comprehension and retention [36]. Some revealed that it is somewhat helpful because it clarifies a few points (41 or 29.5%). This implies that VR/AR can be beneficial, yet it does not fully replace traditional teaching methods or address every student's unique challenges [37]. A few stated that it is not helpful because it doesn't really address their needs (3 or 2.2%). This is because of a lack of personalized feedback or the novelty of the technology, which might not align with their preferred learning styles [38]. One learner reported there was no feedback provided (1 or 0.7%).

**RQ<sub>7</sub>:** What suggestions do young learners propose for improving the implementation of VR and AR in English lessons?

The result of this study showed that YLs proposed suggestions for improving the implementation of AR/VR in learning English. Table 10.4 presents some of the suggestions from learners that were grouped into several themes: accessibility and usability, content quality and engagement, simplicity and clarity, feedback and involvement, satisfaction, and others.

## 10.7 Limitations

This study had some limitations. It relied on self-reporting and only used one data collection technique, so the results were not comprehensive. Additionally, it used a small sample size. Therefore, it is recommended that further research use multiple data collection methods, not only surveys but also observation and interviews, and a large sample size to get better insight.

## 10.8 Educational Implications

1. The study guides teachers and policymakers in identifying effective methods and practices for implementing VR/AR technologies in English language learning.
2. Insights into VR and AR's motivational impact help teachers leverage these tools to sustain engagement and improve learning outcomes among YLs.
3. Identifying benefits such as immersive and interactive learning environments can justify investments and encourage the broader adoption of VR/AR technologies in education.
4. Highlighting challenges like cognitive overload, technical issues, or unfamiliarity with technology can lead to tailored solutions, ensuring that all learners benefit from VR/AR learning.
5. Exploring how teachers deliver feedback in VR/AR contexts can establish best practices for ensuring that feedback remains meaningful, actionable, and supportive for YLs.
6. Understanding YLs' perceptions of feedback can help teachers adapt their methods to be more personalized and effective in meeting individual learning needs.
7. The findings can influence curriculum enhancements to balance traditional methods with the integration of immersive technologies for optimal learning outcomes.
8. The study highlights the need for teacher training programs to prepare educators to effectively use VR/AR technologies and provide impactful feedback in virtual settings.
9. Addressing challenges faced by YLs ensures that VR/AR technologies are inclusive and accessible, minimizing disparities in educational opportunities.
10. Insights from the study can shape educational policies and resource distribution to support the integration of emerging technologies in schools.
11. YLs' suggestions for improving VR/AR implementation provide a valuable perspective, ensuring that these tools are designed to meet their needs and preferences.

## 10.9 Conclusion

It can be concluded that YLs sometimes learn English using VR and AR; the favorite tools they use are VR role-playing games and AR English educational games. YLs liked immersive games and simulations as well as puzzle activities. This study showed that using VR and AR boosted YLs' intrinsic, extrinsic, and integrative motivation. VR and AR have some advantages, such as VR makes learning more engaging and fun, and AR makes learning more interactive and engaging. However, YLs reported that there were some problems in learning English using VR and AR. YLs revealed that teachers provided feedback to them in different ways. Most YLs reported that their teachers provide feedback through verbal instructions or corrections in the virtual environment. YLs also perceived feedback in different ways, but most of the YLs perceived teachers' feedback as useful for them. YLs also propose some suggestions for improvement concerning the implementation of VR and AR in learning English at elementary schools, namely, accessibility and usability, content quality and engagement, simplicity and clarity, feedback and involvement, satisfaction, and others.

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