Virtual reality technologies for learning English: an example of using Immerse

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Article Info

ABSTRACT

This study aims to examine the effectiveness of using the Immerse virtual reality technology as an additional tool for learning English. The sample consisted of 120 students randomly selected from the lists of third-year students studying English as a foreign language according to their bachelor's degree curriculum. The overall sample was divided into two groups. Immerse was a virtual reality technology used for training in an experimental group for three months. The results showed that in the experimental group, there was a significant difference between the pre-test and the post-test ($0.35<0.05$). In the control group, there were no relevant changes. In particular, these data show that the experimental group significantly outperformed the control group in terms of academic performance in English. However, some of the tasks that tested writing skills showed unsatisfactory results. In general, although virtual reality (VR) does not affect students' writing skills, its use is crucial for their long-term memorization.

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1. INTRODUCTION

Teaching and learning have moved forward and replaced pen and paper with information communications and technology [1]. This transition facilitated the process of transferring knowledge and skills to students [2]. The modern use of immersive technologies in the field of education has proven its effectiveness in the study of various subjects. Virtual reality and augmented reality are examples of these new technologies that provide opportunities to advance lifelong learning [3]. Virtual reality (VR) is defined as a real or simulated environment where the perceiver experiences telepresence. Augmented reality (AR) is often referred to as a useful educational technology that can be integrated into lessons to overcome the disadvantages of traditional teaching (such as the lack of visualization of abstract learning content, low involvement and interest of students in classes, insufficient understanding of complex topics) [4]. Mobile applications with augmented reality mode can potentially apply to interactive, mixed/hybrid, and face-to-face learning. These forms of learning are especially important during emergencies.

To reproduce or create a realistic learning environment, virtual reality generates images, sounds, and other experiences [5]. VR has several distinctive characteristics, including the representation of three-dimensional images, virtual objects that simulate real-world behavior, and interactive features that allow users

to interact with the virtual environment [6]. As an educational and training tool, virtual reality is used to simulate the interaction of objects and visualize complex concepts. A virtual reality experience spans a variety of platforms, from smartphones to headset-based options such as Google Cardboard, Samsung Gear VR, and desktop systems with mounted monitors (HTC Vive, Oculus Rift, and Sony PlayStation VR) [7]. In addition, three-dimensional virtual environments can be accessed on both desktop and mobile devices, eliminating the need for a virtual reality headset (Second Life or Unity 3D) [8].

Since virtual reality is considered to be a very promising technology for both computer training and modeling, it is widely used in numerous applications. Its highly interactive environment allows users to participate in a computer-generated world where they can interact with various stimuli [9]. Currently, most VR applications require students to wear devices such as head-mounted displays (HMD), trackers, or sensors. These devices have several disadvantages. They are usually relatively expensive, heavy, and easily damaged. In addition, systems that involve additional devices fail to appropriately determine the user settings [10]. However, desktop VR applications imply a lower level of immersion, which can be a problem. User interaction in this case requires the use of a chromakey (a blue or green screen). Another widely available VR solution is desktop VR. Desktop VR is an even lower level of immersive VR that can be easily used in most applications without any special device [11]. Desktop VR is usually considered the most inexpensive of all VR options, and it is widely used in educational institutions.

The use of high-immersion virtual reality in education is constantly increasing. The growing demand for advanced VR technology explains a need for a deeper understanding of VR-based learning and the theories behind its use. In classrooms, this immersive technology is gaining popularity and success. Students are motivated and interested in learning in VR thanks to an immersive and interactive environment.

2. LITERATURE REVIEW

The idea of VR originated in the mid-1960s. The research on VR as a learning tool is attracting more and more attention in various fields of education and training, including teacher training [12] and language learning [13]. VR allows users to experience the virtual environment as if it was real both in sensations and appearance. The reason for the popularity of VR technology is its capability to interact with both real and virtual objects, facilitating learning through experience. This feature increases learners' attention and motivation. VR applications are used in several education sectors for early learning and primary school when teaching English in other countries [14], [15]. Studies have proven that the ability to use VR applications increases students' motivation and contributes to a more favorable attitude to learning English. If technology is easy to master and apply, students are more likely to favor it.

Among the various options, VR with video capture provides a higher level of immersion at a low cost. Due to the low price and the growing popularity of video cameras, researchers use them in combination with computer vision technology to develop applications [16]. In addition, some computer game developers have released games that allow users to physically control the interaction (for example, Nintendo's Wii and Sony's EyeToy). However, games of this type focus on entertainment, not learning. Although the use of VR with video capture is growing, there are still few applications devoted to language learning [17]. None of the above-mentioned systems offers educational tasks designed with integrated educational content. Therefore, teachers do not have the opportunity to include relevant educational materials in the systems.

At the same time, most systems require the use of professional video cameras. Depending on the stage of VR development, it has many definitions and categories. VR has been described as a real or simulated environment allowing the perceiver to experience telepresence. Another definition indicates that it is a computer-generated 360° virtual space that can be perceived as spatially realistic due to the high immersion provided by a head-mounted device [18]. In general, VR technologies can be divided into two categories: VR with a low level of immersion, which is viewed on a two-dimensional flat screen; and VR with a high level of immersion, which requires the user to wear a head-mounted VR headset. The degree of immersion and presence are the features that distinguish the two types of VR. VR headsets help disconnect from the outside world to fully immerse in virtual reality [19]. In addition, the touch input embedded in the VR headset improves immersion and presence. Although VR can be a useful tool, it cannot replace real communication and personal language practice. VR can serve as a complement to traditional teaching methods, providing an exciting and relevant experience that improves language learning. VR and AR support constructivist learning principles. Consequently, students who use VR and AR can process and manage various learning-related activities [20]. Thus, students have full control over the time and place of studying; for example, they can change the pace of their movement in a VR environment. There is also an opportunity to communicate with friends via the network and perform any necessary action after communication.

On the other hand, several studies based on virtual reality have also presented some opposite conclusions. The studies provided evidence that virtual reality may negatively affect learning outcomes.

High levels of immersion and presence shift the focus from the educational aspect of learning. The negative impact of virtual reality was noticed in various academic subjects, including STEM [21], history [22], and language learning [23]. In most (7 out of 11) studies, students who used desktop learning environments demonstrated higher learning outcomes compared to students who used virtual reality with a high level of immersion [22]. As an example, students learning vocabulary with a VR headset had significantly lower scores compared to those participants who used a less immersive desktop version of VR [24].

Scholars also identified the factors that significantly affect the success of technology integration. These factors include the opinions of students and teachers; institutional support; obstacles to integration; justification for integration; past technological experience. Therefore, it is extremely important to study the attitude of end users at the early stages of VR technology integration [25]. Virtual reality is able to 'trick' consumers into believing that they are inside a virtual experience, allowing them to fully immerse themselves in virtual reality material. From a pedagogical point of view, VR should serve as a potentially fascinating platform to complement classroom learning, which is often associated with relatively low engagement [26]. A high level of immersion and presence are variables leading to high engagement.

The advent of virtual reality technology has not only increased the integration and application of technology but also brought a new model of teaching English, introducing the concept of learning games that attract students. The technology was presented as a new form of media, consisting of virtual experiments on learning English, training skills, the interactive use of virtual reality scenes or images, and the full mobilization of educational initiative and creativity of students [27]. The use of technology can activate cognitive tools and make conscious learning possible. Thus, VR technologies can improve the ability to perceive information, especially in the case of learning abstract concepts [28]. In addition, VR reduces cognitive load due to the sense of reality and immersion, thereby increasing the ability to conceptualize and learn information.

Virtual reality is a visual experience that stands out for its element of 'reality' and a sense of immersion. As a learning tool, it offers excellent opportunities to improve learning efficiency [29]. One of the advantages related to VR-based training is an expanded spatial knowledge of visual stimuli. This feature implies the opportunity to interact with images in a way that is impossible when viewing conventional 2D formats. Second, virtual reality enables users to perform tasks that would be impossible to complete in real-world conditions [30]. Third, increased motivation and engagement contribute to the high motivation of students to learn and participate in educational activities. Contextualized learning is another concept that assumes the introduction of information in a context that is appropriate for students. Finally, VR facilitates effective collaborative learning and allows students to interact in scenarios that imitate real life [31]. The language learning aspect of VR requires considerable research and development. Long-term forecasts for the use of virtual reality in language learning and teaching are sufficiently positive. However, the VR-based assessment of language learning skills is still imperfect.

This study aims to examine the effectiveness of using VR technologies as an additional tool for learning English. To this end, it was necessary to accomplish the following tasks: i) Collect data from students about their awareness and experience with virtual reality technologies in an educational context; ii) Evaluate and analyze the effectiveness of this tool based on the participants' English language proficiency indicators.

3. METHOD
3.1. Research design
To achieve the objective of the study, the authors conducted two-stage action research [32]. This type of research uses an interactive methodology, including the definition of the problem, planning of actions, implementation of the plan, and evaluation of results. In this study, the first stage (cycle) was the design stage, which included the selection of materials and concepts for the game. After the training system and modules were planned and developed, the implementation stage was held. At this stage, the authors carried out a pilot study, which indicated the need to change the training materials. In the second cycle, the researchers performed experiments and used upgraded materials to evaluate and analyze the students' learning experience based on virtual reality. Based on the results of the first cycle, the planning of the second cycle implied changing the action plan and conducting additional research (questionnaires, testing, descriptive statistical analysis of the average score). These methods served as the basis for obtaining qualitative and quantitative results.

The participants (students) took an educational course that lasted 3 months. The course implied completing tasks with a virtual reality application. To this end, students were asked to use Immerse in the classroom. This platform had been insufficiently studied before. The researchers chose Immerse since its VR learning environment with video capture did not require an avatar to interact with objects on the screen. This peculiarity distinguished it from traditional VR environments that require wearing heavy and expensive sensors. In addition, the platform is easy to use. It also provides an immersive language learning experience, allowing students to practice their English language skills by interacting with the virtual environment and engaging in conversations with virtual characters or other language learners. Immerse offers a range of

materials and exercises for language learning to expand vocabulary, listening, speaking, and understanding of culture. At the same time, Immerse is the first synchronous platform for teaching and learning languages in virtual reality, which has always given priority to long-term language interaction, rather than basic vocabulary and listening comprehension [33]. The focus on this direction makes it possible to practice speaking and listening skills in a more immersive and social context. Students could physically and naturally interact with virtual objects on the screen. The learning environment intended for the classroom must allow the teacher to fulfill the requirements of the curriculum and easily edit educational materials. Immerse also coped with the task.

The methodology used to evaluate the effectiveness of teaching English corresponds to a quasi-experimental design. After several consultations with an English teacher, it was possible to select the study tasks that followed the curriculum. Classes with virtual reality technologies took place twice a week for three months under the supervision of university teachers. Before that, a pre-test on general academic performance in English was conducted in the classroom. The pre-test consisted of 30 open and closed assignments and covered all the main areas of English learning. The same test with other tasks was conducted at the end of the experiment. The tests included sections on listening, speaking, reading, and writing. The purpose of these tests was to measure language skills based on the standards of language proficiency. The pre-test and post-test were prepared based on the content of the training modules. A group of three independent experts in the field of teaching English as a foreign language (TEFL) verified the validity of the tests.

3.2. Participants

The study involved a sample of 120 students aged 18 to 22 years. They studied at Far Eastern Federal University and Moscow Aviation Institute. The study was conducted within two institutions, so the sample of 120 students is substantial and adequate, especially if it represents a significant proportion of students who are ready for intervention [34]. Action research often relies more on qualitative data and descriptive statistics than on sophisticated statistical analysis, so it was appropriate to use a small sample. The selection of participants was random; the researchers used the lists of students provided by the university administrations. The selected students voluntarily agreed to participate in the study. According to the inclusion criteria, all participants studied English as a foreign language in the third year of their bachelor's degree program. The general sample was randomly divided into two groups. The control group performed the traditional educational activities. The experimental group studied using virtual reality technologies.

3.3. Survey

It was essential to assess whether students were ready to use the VR learning system. To this end, the study utilized a questionnaire. The students received a link to this questionnaire and filled it out online. The number of completed questionnaires was 120. There was a total of 10 questions.
i) Have you had any experience using virtual reality technologies during your university studies?
ii) Do you think VR has the potential to improve learning efficiency?
iii) Have you ever used VR for educational purposes outside of university?
iv) Do you think VR can provide a more engaging and immersive learning environment compared to traditional methods?
v) Have you studied VR apps specifically designed for language learning?
vi) Are you aware of potential problems or limitations related to the use of VR in education?
vii) Do you think that VR technology is expensive and difficult to implement in an educational environment?
viii) Have you witnessed the use of VR in education?
ix) Do you think VR will become a more common learning tool in the future?
x) Do you believe that VR can effectively improve your English skills?

The survey covered the use of technology in general and in education, in particular, the perception of VR as a means of learning, and knowledge in the field of VR. The questions were compiled by a group of teachers and approved by the university administration. After passing the online tests, the experimental group had to fill out the second questionnaire with five statements. It helped to analyze the participants' involvement in learning new methods and their effectiveness for students.

3.4. Statistical processing

This study used Cronbach's alpha (a) to assess the reliability of the data obtained. The SPSS version 25 program served as a computational tool. A scale for interpreting Cronbach's alpha values was: >0.9 (Excellent); >0.8 (Very good); 0.7 (Satisfactory); 0.6 (Unsatisfactory); >0.5 (Poor). Thus, the validity of the questionnaire revealed an acceptable value of Cronbach's alpha (a=0.88). The study also employed the descriptive statistical analysis of the average score (Mean) and standard deviation (SD) tests of achievements in English language learning. Nonparametric tests served as tools for the analysis of the data since the sample size was small. To compare the success of students in learning English between the pre-test and post-test in two groups, the study utilized the Wilcoxon signed-rank test.

3.5. Research limitations and ethical issues

The study was limited to a small sample of participants. In addition, the experiment involved only university students. The experiments with younger students might have had different results. Only one technology was used to assess students' knowledge. A long-term study may use a bigger number of virtual reality applications and materials. All the processes of the study that involved the participation of people corresponded to the ethical standards of research. Informed consent was obtained from all participants in this study. Ethical standards were not violated.

4. RESULTS AND DISCUSSION

The survey conducted in the first stage of the study showed that only 5% of the total number of students had experience working with VR tools during their studies at the university. Most students had not personally used VR technology before. However, they believed in its effectiveness and wanted to try it for educational purposes. This fact indicates a great interest and openness to the introduction of VR into their English language learning program. Table 1 presents the results.

Table 1. The results of the survey on the experience of using virtual reality

Question	Yes (%)	No (%)
1. Have you had any experience using virtual reality technologies during your university studies?	5%	95%
2. Do you think VR has the potential to improve learning efficiency?	95%	5%
3. Have you ever used VR for educational purposes outside of university?	5%	95%
4. Do you think VR can provide a more engaging and immersive learning environment compared to traditional methods?	94%	6%
5. Have you studied VR apps specifically designed for language learning?	1%	2%
6. Are you aware of potential problems or limitations related to the use of VR in education?	3%	97%
7. Do you think that VR technology is expensive and difficult to implement in an educational environment?	61%	39%
8. Have you witnessed the use of VR in education?	7%	93%
9. Do you think VR will become a more common learning tool in the future?	99%	1%
10. Do you believe that VR can effectively improve your English skills?	91%	9%

According to the results, most students expressed faith in the potential of VR to improve learning efficiency (95%). However, only a small percentage of students used VR for educational purposes outside the university (5%). Similarly, a low percentage of students studied VR apps specifically designed for language learning (1%). Regarding awareness of potential problems or limitations when using VR in education, 97% of students indicated that they were not fully aware of these issues. The majority of students believed that VR technology was expensive and difficult to implement in the educational environment (61%). However, a significant number of students (93%) had witnessed the use of VR in education. Moreover, most students (99%) believed that VR would become a more widespread learning tool in the future. In addition, 91% of students claimed that VR could effectively improve their English language skills. These data confirm the need to modernize teaching technologies for the benefit of students who keep up with new tools. The students also shared their ideas about the development of different skills (reading, writing, listening, speaking, vocabulary) with VR. The results showed that the students had a significant interest in testing VR methods. Almost all participants were deprived of this experience. The above justified the use of the developed course in the experimental group.

In general, the course included vocabulary exercises or listening to brief dialogues. Teachers could develop scenarios in Immerse and engage groups of students to participate in real situations ('networking event', 'airport', 'news station', and 'kitchen'). Figures 1(a) to 1(d) show the places of experience that students could use for contextual language learning.

The work with the virtual reality tool implies using a communicative approach with a focus on performing real tasks in the target language. Figure 2 shows a realistic environment where students can practice their presentation and speaking skills in front of a real audience in an immersive environment. These assignments (especially in the context of EFL) help students overcome the fear of public speaking. Firstly, by using an avatar, students reduce their anxiety and feel more confident when speaking in English. Secondly, an educational situation can be more contextualized, which is impossible to do in a real classroom.

Figure 2 shows the experience of working with a Networking Event. In one scenario, students may be asked to complete a task to master their abilities to solve problems related to an emergency at work. A realistic working meeting environment facilitates this process. Students can collaborate, help each other complete assignments and learn to negotiate in a simulated professional context or a virtual experience. Therefore, Immerse is more than a simple English language practice. Students who learn through experience can develop a sense of 'togetherness' in an immersive and interactive 3D environment.

(a)   (b)

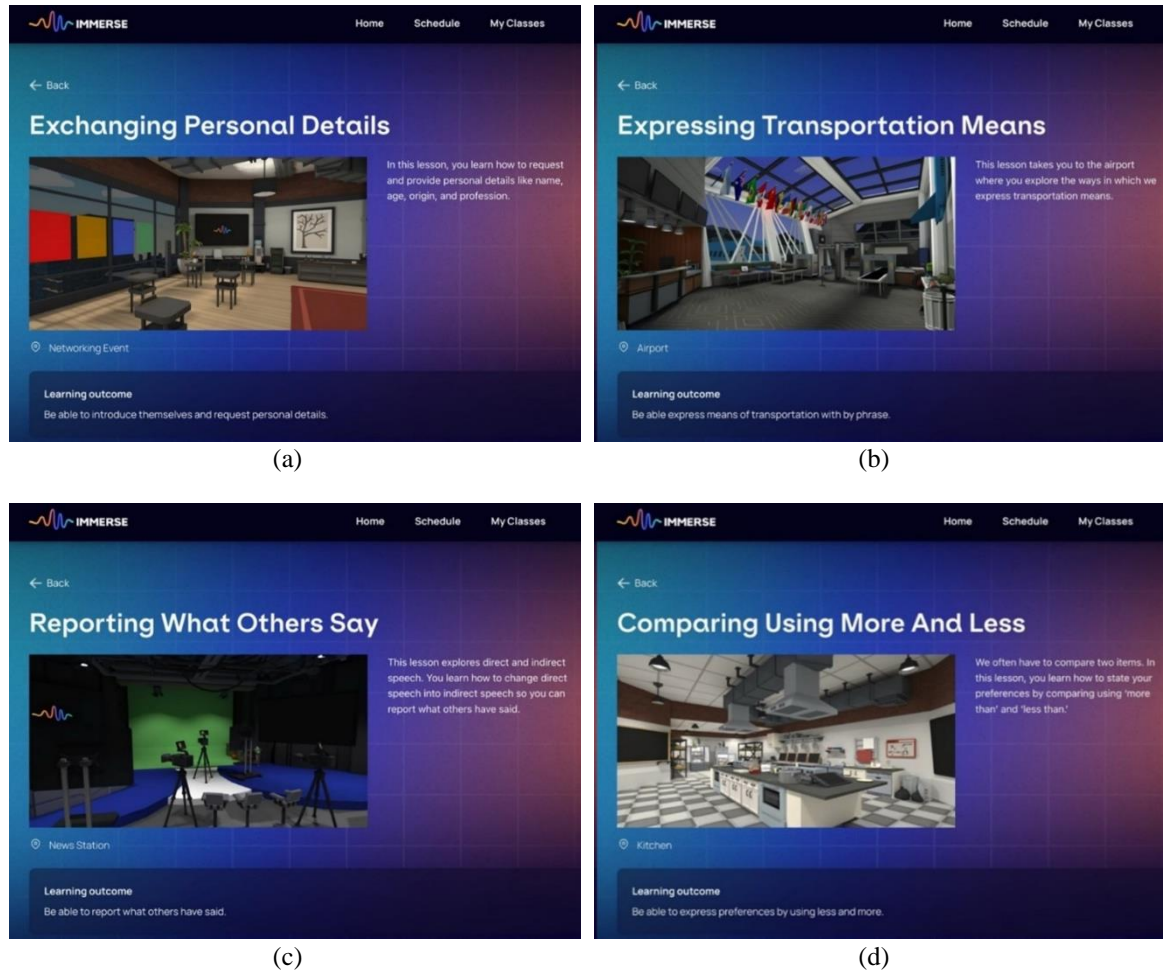(c)   (d)

Figure 1. Experiences in Immerse at (a) networking event, (b) airport, (c) news station, and (d) kitchen

Figure 2. The development of speaking skills in front of an audience

A virtual airport is an appropriate environment to train and strengthen students' abilities to solve problems and communicate. Figure 3 shows the check-in desk. It has several screens that display flight information. Depending on the situation, students can play various characters, such as passengers or flight attendants, or switch between these roles.

Figure 3. The development of speaking skills in an airport environment

The work with the proposed virtual reality technology allowed us to gain enough experience and knowledge to improve the learning process, as well as to objectively assess the application in the questionnaire. Thus, the results of statistical analysis of the pre-test and post-test showed that in the experimental group, there was a significant difference between the pre-test and the post-test (0.35<0.05). On the contrary, the results of the control group did not change. To interpret the results, the test statistic value (0.35) was compared with the critical value that corresponded to the significance level (0.05). The value of the test statistics is lower than the critical value. Therefore, there is a significant difference between the two related samples. These data show that the experimental group significantly outperformed the control group in terms of academic performance in English. However, some results of writing tasks showed unsatisfactory results. VR did not have a significant impact on the quality of writing in English. Thus, students in the control group showed better results in traditional writing. Their result was 9.5 in comparison with the indicator 7.1 of the experimental group. In general, although VR does not affect writing skills, it positively impacts long-term memorization.

After completing the online tests, the experimental group had to fill out questionnaires that helped scientists analyze the participants' involvement in learning new methods and their effectiveness for students. This stage aimed to investigate students' opinions about their disappointments and expectations regarding VR. The following are the questions from the questionnaire and the received answers.

i)   The answers of students and the results of tests on the general level of English show that virtual reality technologies mainly improve pronunciation and speaking skills. 'Was it useful to study this course and simultaneously train pronunciation and speaking skills?'. The answers to this question were very useful (32%); useful (60%); useless (8%).

ii) The second question was as: 'Was it interesting to learn using innovative methods?'; very interesting (18%); interesting (69%); not interesting at all (13%).

iii) 'Is the game environment close to reality?' the students gave the following answers: very close to reality (88%); quite real (2%); far from reality (10%).

These answers confirm the conclusion about the perception of the interface and the various types of 'experience' presented by VR technology. Users appreciate its high quality and design that mimics real-life situations and settings. These features considerably simplify language learning.

iv) The questionnaire also contained the following statement 'VR has made my writing more effective'. Only 20% completely agreed with it, 25% partially agreed and 45% disagreed with the statement.

v)   Nevertheless, another statement ('VR made my speaking skills more effective') resulted in the opposite answers. In this case, 80% of students completely agreed with the statement, 11% partially agreed, and 9% did not agree with it at all.

The results of the post-test confirmed these conclusions: there was an improvement in speaking and listening skills. These data made it possible to determine the level of student engagement. Thus, it was 71.5%, which is a fairly high indicator of variance. The standard error was 3.1.

According to the action research, the authors compiled a model of an English course based on virtual reality (the Immerse platform). There is a brief description of the course: i) Lessons in the classroom twice a week under the guidance of a teacher; ii) Each lesson focuses on immersion (group or individual) in a virtual environment selected by the teacher in advance. The set of virtual environments includes real situations in 'A networking event', 'An airport', 'A news station', and 'A kitchen'; iii) The tasks mainly aim to develop

skills in speaking, public speech, vocabulary memorization, and listening skills. Writing is involved to a lesser extent, and the results in this area are not particularly productive; iv) The students' engagement depends on a realistic interactive environment. In this case, the teacher is only a curator in this process.

Hence, virtual reality can be a highly effective tool for learning English as a second language. By immersing students in a virtual environment, VR provides a realistic and engaging platform for practicing and improving language skills. The following are several VR advantages in terms of improving the learning process of the experimental group:

i)   Immersion in the language environment. VR can simulate real-world scenarios, such as ordering food at a restaurant or participating in a job interview. In these scenarios, students can interact with virtual characters or objects. This immersive experience allowed the experimental group to practice their English language skills contextually.

ii) The practice of pronunciation and colloquial speech. VR technologies offered speech recognition functions, providing instant feedback on pronunciation and intonation. Students communicated with virtual characters or participated in language exercises, receiving immediate comments and recommendations for improving conversational skills.

iii) Language learning that goes beyond grammar and vocabulary. VR transported students to various cultural environments, allowing them to get acquainted with the customs, traditions, and social norms of English-speaking countries. The cultural context helped develop a deeper understanding of the language and its content, Improving the results of the control tests.

iv) Virtual reality has made the language learning process more enjoyable and motivating through gamification. By integrating such game elements as rewards, challenges, and levels, VR apps engaged students and kept them interested throughout the experiment. The gamified approach encouraged active participation and facilitated the memorization of new words.

v)   It is crucial to develop students' computational thinking, as well as increase their ability to work in a team, make accurate decisions, and deploy arguments. This is especially true for English language courses that encourage the study of culture, original thinking, and oral speech.

The above supports the conclusion about the efficiency of VR apps, which can improve language learning. Nonetheless, this technology should not replace traditional language learning methods. VR is more effective as an additional tool for classroom teaching, textbooks, and real language practice.

Immerse as an educational program has also been studied in the context of ESP. Several similar studies have investigated other technologies, but they present controversial results. In one of these studies, the PILE interactive learning environment was developed by integrating virtual reality technology with video capture into the classroom [35]. The system aimed at English lessons in elementary school, where students could interact with the system through physical movements. To study the effect of using the PILE system, the researchers conducted an empirical study to compare two different types of methods of teaching English. The research sample consisted of second-grade students from a Taiwanese school. The results of the pre-test and the post-test showed a significant a considerable improvement in English language performance in the experimental group. Another test conducted after the end of the study demonstrated considerable differences between the two groups. These results indicate that the system has had a significant positive impact on long-term learning [36]. In comparison with Immerse, PILE is effective only in long-term training. It also requires the use of expensive sensors, which are a necessary tool for the operation of this system. Immerse is more beneficial in this case: it is free and effective even in a short period of training. The results of the current study are comparable to the above-mentioned ones. It is possible to note a significant difference between the pre-test and post-test results (p-value=0.35<0.05). This fact indicates a significant improvement in the level of English proficiency in the experimental group compared to the control group. VR has a more gamified form, which is interesting for both schoolchildren and university students.

A qualitative case study conducted in Malaysia examined the prospects of using AR and VR in teaching and learning English by secondary school teachers [37]. The study demonstrated both positive and negative opinions about the use of AR and VR in English language teaching and learning activities. Negative aspects were time costs and health-related issues. The findings confirm that virtual reality systems may be harmful to students and their health [38]. Another study suggests an SVVR approach to solve this problem [39]. To assess the effectiveness of the proposed methodology, the authors performed a quasi-experiment. The results showed that EFL students who used the ASS-SVVR method demonstrated high reading comprehension, intrinsic motivation to learn, and metacognitive awareness of the reading strategy. Immerse also improves reading skills rather than writing. There was no significant difference between the two groups in terms of cognitive load or sense of presence.

In another study, researchers developed an approach of co-drafting an argument scheme based on virtual reality [40]. The quasi-experiment involved 45 EFL students. The results showed that in comparison with the non-VR strategy of joint argument drafting, the method of joint argument drafting based on virtual

reality (VR-CAM) significantly improved the oral presentations of students in English. Although the VR-CAM group was superior to the non-VR-CAM group regarding interest in studying culture, there was no noticeable difference between the two groups. In addition, students who studied with VR-CAM eventually surpassed those who studied without it in terms of computational and creative thinking. Another study of VR technology aimed to examine their impact on the development of EFL writing skills [41]. It used a consistent research mixed methodology: qualitative data were first analyzed and then synchronized with quantitative results. According to the results, most participants believed that VR provided the greatest benefit in acquiring listening skills. This conclusion is consistent with the results of the current study. Participants showed a slight improvement in writing skills only when they received information using VR for writing purposes. The students were satisfied with the VR experience and found it surreal in terms of the learning environment.

5. CONCLUSION

The results of this study shed light on the effectiveness of integrating Immerse virtual reality technology as an additional English language learning tool among third-year English as a Foreign Language students. The results showed that only 5% of students had previously had experience with VR tools while studying at the university. Given the level of English proficiency in the experimental group, we can note a significant difference between the pre-test and post-test results (p-value=0.35<0.05). To interpret the results, the test statistic value (0.35) was compared with the critical value corresponding to the significance level (0.05). The value of the test statistics is lower than the critical value. It indicates a significant difference between the two related samples. In particular, these data show that the experimental group significantly outperformed the control group in terms of academic performance in English. However, it should be noted that VR did not have a significant impact on the level of writing in English: the control group outperformed the experimental group in traditional writing tasks. In general, the findings show that virtual reality technology can be very effective in improving pronunciation and conversational skills when learning a language. It provides an exciting and engaging platform for working out real-world scenarios and receiving instant feedback. This work complements the practical and theoretical knowledge bases as it has developed and tested a practical English language learning course using VR technologies. It offers practical insights into the effectiveness of using VR technology in improving English language skills, and its design and research findings can inform future research and educational practice. However, there is a need for further research in this direction. Future studies may address the limitations and explore additional language learning aspects affected by VR (for instance, writing skills). This study will be a useful reference base for designing and implementing VR in any pedagogical program as an additional educational technology. Further research on this topic may focus on creating courses for different age groups and other language skills, such as speaking, listening, and reading.

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