

The Potential of Metaverse in Speaking Skills of English Education

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Abstract: The Metaverse, a three-dimensional (3D) virtual world network that includes social and economic interactions through virtual reality (VR) and augmented reality (AR) devices, has been recognized as a transformative concept in a variety of fields, including education. As technology advances at a rapid pace, the potential of the Metaverse to revolutionize teaching and learning has become increasingly prominent. Particularly in English education, the Metaverse offers promising solutions to address the challenges of oral English education during the COVID-19 era. This paper explores the potential of the Metaverse in enhancing oral English education and highlights its future possibilities. Drawing from the realms of AR and VR, this paper also examines teaching approaches and strategies that integrate the Metaverse into oral English instruction. By leveraging the immersive and interactive nature of the Metaverse, educators or students can create engaging learning experiences that foster oral English communication skills.

Keywords: Metaverse, English education, speaking skills, virtual reality, augmented reality

1 Introduction

In the constantly developing field of education, the integration of technology has been changing traditional teaching and learning practices. Metaverse is an exceptional potential emerging technology. It is a virtual reality space that includes augmented reality (AR) and virtual reality (VR) experiences. With its immersive and interactive nature, Metaverse provides unique opportunities for educational innovation, especially in the development of oral skills in English education. It provides a virtual space that replicates real-life scenarios, allowing learners to participate in simulated dialogues and interactive activities, and promoting the development of their oral skills in a controllable but dynamic environment.

This paper profoundly studies the potential of the Metaverse as a transformative tool to improve the oral skills of English language learners, emphasizes its unique features and applications, and provides teaching methods and strategies for integrating the Metaverse into oral English teaching and learning in order to address the challenges of oral English skills development.

2 Definition

2.1 Definition of Metaverse

The concept of “Metaverse” was popularized by science fiction, particularly in Neal Stephenson's novel "Snow Crash" published in 1992 [1]. The Metaverse is described in the novel as a virtual reality-based successor to the internet, where individuals can engage in numerous activities, such as conducting business, socializing, and even participating in games and adventures [13].

Furthermore, virtual reality (VR) and augmented reality (AR) are frequently connected with the Metaverse. It is envisioned as a huge and persistent digital universe in which users can create, own, and exchange virtual objects, communicate with others, and explore seemingly unlimited possibilities [3]. The development of the Metaverse includes features like virtual economies, user-generated content, immersive experiences, and social interactions, all of which link into an integrated virtual ecosystem.

2.2 Definition of English Education

English education refers to the process of teaching and learning the English language, as well as the literature, culture, and communication skills associated with it [2]. It also encompasses various aspects, including reading, writing, speaking, and listening in English.

In general, English education starts with the basic knowledge of English, such as vocabulary, grammar, and sentence structure, and then advances to higher-level skills, such as comprehension, critical analysis, and effective communication. During this process, it can be carried out through different methods, including communicative language teaching, task-based learning, and immersive courses. Meanwhile, it usually involves the combination of classroom teaching, interactive activities, language practice, and assessment to promote Language acquisition and skill development [4].

3 Metaverse Technology

3.1 Virtual Reality (VR)

Virtual Reality (VR) is a technology in which a computer creates a 3D environment that allows the user to interact with the generated simulations through specific devices, such as VR headsets and controllers. These devices typically use motion tracking sensors to detect the user's movements and adjust the display in real-time to create a sense of immersion, it can break the gap between reality and virtual scene. For controlling VR, VR headsets come in various forms, ranging from tethered systems that require a computer to run, to standalone devices that operate independently [11].

3.2 Augmented Reality (AR)

AR is an interactive experience technology that combines computer-generated virtual imagery with the real world, enhancing users' perceptions of their surroundings. AR can also provide users with additional information, create interactive experiences, and enhance learning and

training by overlapping reality and digital content. AR technology can be used in various devices, including mobile phones and computers. Mobile AR apps, such as Pokémon Go, are a good example of AR, which uses the device's camera to capture real-world images and overlay digital content through AR [11].

4 Pedagogical Approaches and Strategies

Based on previous articles, research results, and the creation of Metaverse technology (such as VR and AR), this part lists some possible pedagogical approaches and strategies for improving the efficiency of English-speaking education.

4.1 Virtual Reality (VR) in English-Speaking Education

In recent years, the integration of VR technology into language learning has received substantial attention due to its potential to revolutionize how students develop their oral English skills. The immersive nature of VR offers learners a dynamic platform where they can engage in lifelike conversations with virtual characters, an experience akin to real-life interactions. As Figure 1 [12] highlights, platforms like Immerse have emerged as pioneers in this field, providing learners with quantifiable, realistic, and interactive scenarios for instructor-led training and assessment. A growing amount of research demonstrates the pertinence and positive impact of VR on language acquisition.



Fig. 1. Students are using English to discuss in VR scene [12]

As shown in Figure 2 [10], the study showed that out of 88 articles on AR and VR, 28.6 percent used VR/AR tools to enhance vocabulary acquisition, and 18.4 percent examined AR/VR support for English oral skills. Teachers can use VR programs to pre-set a scene for the students and employ task-based teaching methods. For instance, the teacher can set up a scenario for the students to order and eat in a restaurant; the students will act as customers and engage in various activities, including interacting with the staff and placing orders. Students are given learning activities that are intended to direct their learning in a way that will enhance their oral English [7]. Students can learn English speaking skills in a relaxed atmosphere by simply holding the VR devices, which will completely present an actual scene.

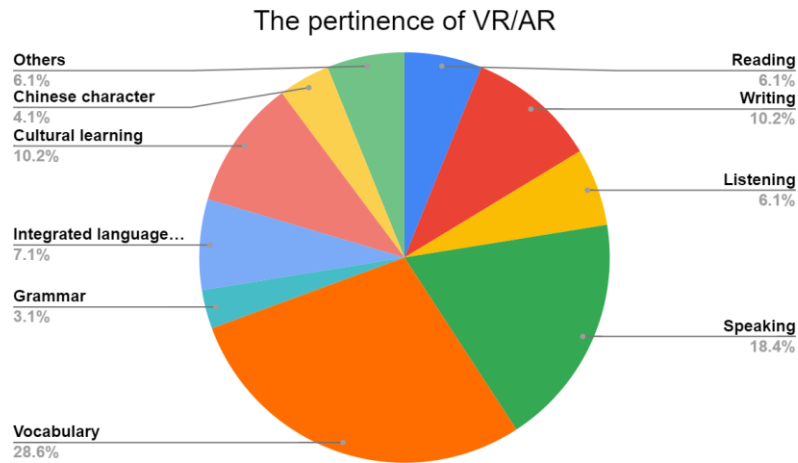


Fig. 2. The pertinence of VR and AR tools [10]

Meanwhile, VR tools are also highly useful in this field. The results of an experiment using the Metaverse smart education model showed that students in the experimental group had higher scores than students in the control group in oral English (reading, role play, translation), vocabulary and grammar and so on. ($F = 146.887, 60.392, 98.130, 88.989, 57.290, 133.641$) (Table 1) [14]. Additionally, the study noted that participants interacted and collaborated in the Metaverse, which not only positively impacted learning outcomes, but also that participants gained a sense of identity and belonging in the collaborative process, rather than as a temporary place to accomplish tasks [14].

Table 1: Research comparison of students' learning outcomes [14].

Source	Dependent variable	Type III Sum of Squares	df	Mean square	F	
Group	Speaking	Reading	212.817	1	212.817	146.887
		Role play	43.350	1	43.350	60.392
		Translation	64.067	1	64.067	98.130
	Vocabulary and Grammar		114.817	1	114.817	88.989
	Reading Comprehension		129.067	1	129.067	57.290
	Writing		166.667	1	166.667	133.641

4.2 Augmented Reality (AR) in English-Speaking Education

4.2.1 The Principle of an AR Game-Aided Model for Improving Children's Education

One promising pedagogical approach is using AR game-aided model for teaching English pronunciation to children. By integrating augmented reality technology into language learning, this model aims to create an immersive and engaging environment that facilitates effective pronunciation instruction [9]. The model shown in Figure 3 mainly uses Unity3D and 3Ds Max software to assist in teaching pronunciation to elementary school students. Through the

integration of AR technology, students could independently choose communication scenes, objects, and difficulty levels and engage in repeated practice until proficiency was achieved.

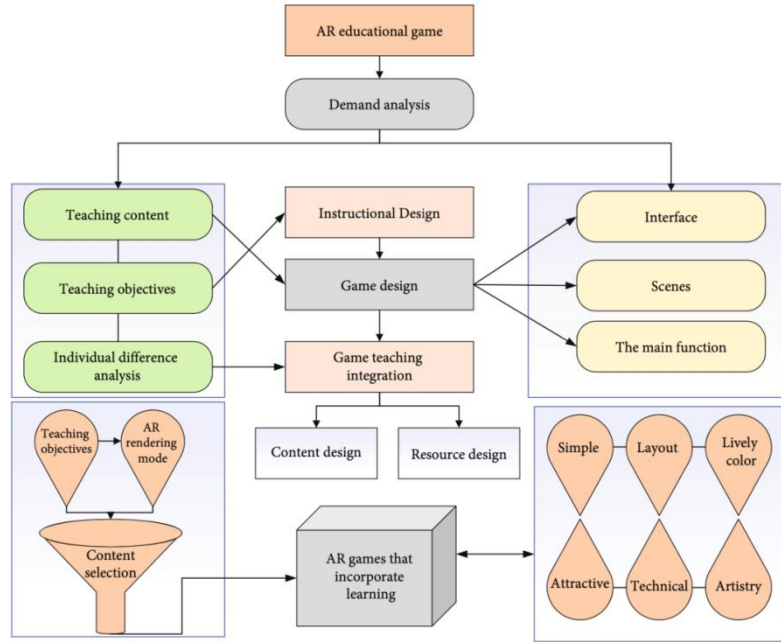


Fig. 3. Example of AR model in Assist Children’s English Pronunciation Teaching [9]

Considering that students need to use the model's feature descriptors of the model in real-time on simple mobile devices, it is required to have low computational complexity and fast speed. Then AR model employs BRIEF (Binary Robust Independent Element Features). BRIEF is an efficient feature point descriptor. Equation (1) is a binary test and equation (2) is the BRIEF descriptor [5]. Even with relatively few bits, it can use simple Hamming distance and have high discrimination. As a result, both time and space costs are low and suitable for mobile devices with limited performance. Unity3D users can develop simple but realistic oral English learning environments on Windows, Mac, and other mobile platforms.

$$\tau(p;x,y): \begin{cases} 1 & \text{if } p(x) < p(y) \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

$$f_{n_d}(p) = \sum_{1 \leq i \leq n_d} 2^{i-1} \tau(p; x_i, y_j) \quad (2)$$

4.2.2 Create a Realistic and Interactive Situation for Students

The realism and vividness of AR provide an immersive experience that simulates manipulation and enables the virtual world to give feedback to users. AR systems can offer students a heightened sense of realism by superimposing virtual elements onto the real world.

This approach enables students to actively manipulate virtual objects and receive real-time feedback, fostering a deeper understanding of the subject matter. For example, AR software can be designed to present language instruction in real-life situations, incorporating vocabulary and sentences that are applicable to daily interactions. As Figure 4 demonstrated, students can navigate various scenarios, assess their progress through real-time tests, and receive immediate feedback on their performance.



Fig. 4. Example of AR software [8].

This approach helps students learn more intuitively and comprehensively, enhancing their immersion and perception of abstract concepts. Like Ho, Hsieh, and Sun's research, they created an AR software that allows students to get familiar with the highlighted local features, mark-up, scaffolding instruction, and real-time tests [8]. The system will connect the database to provide scenery-related instruction and attendant learning materials, such as vocabulary or sentences applicable in real-life contexts.

5 Implications and Future Directions

5.1 Address the Issue of the Digital Divide

As Metaverse becomes increasingly common in education, ensuring fair access to these technologies and resources is essential. The future direction should focus on providing equal opportunities for all learners, regardless of their socio-economic background. Educators, researchers, and technology developers should expand the use of Metaverse technology, offer training and support for educators, and strive to narrow the digital divide.

From the perspective of educators, incorporating Metaverse into language classrooms requires teachers to adjust their teaching practices and proficiently use Metaverse technology. Consequently, relevant professionals should highlight the need to complete professional development programs to provide teachers with the skills, knowledge, and confidence they need to integrate Metaverse into their teaching approaches effectively. Training programs, seminars, and Collaborative learning communities can also assist educators in realizing the full potential of Metaverse and modifying their education strategies [6].

5.2 Evaluation of Oral Skills in Metaverse

Traditional assessment techniques may not fully capture the complexity and authenticity of oral skills developed in virtual environments. Future research should explore innovative evaluation methods, such as performance-based evaluation, peer evaluation, and automatic feedback systems, to evaluate oral proficiency in language learning environments based on Metaverse. Creating reliable and valid assessments will guarantee that learners' progress in speaking skills is accurately measured and recognized.

5.3 Ethical Considerations

As Metaverse advances, it is extremely important to address ethical problems such as student privacy, data security, and digital citizenship. Future research and guidelines should focus on promoting the responsible use of Metaverse technology, ensuring the well-being of learners, and promoting inclusive and fair practices in virtual learning settings. Educators and policymakers need to collaborate to create standards and policies that protect students while ensuring their safe and ethical involvement in the Metaverse.

6 Conclusion

In summary, this paper explores the potential of the Metaverse as a revolutionary tool for strengthening oral skills in English teaching. By integrating Metaverse technologies such as AR and VR, educators can design oral activities, collaborative tasks, and virtual simulations, providing learners with the opportunity to develop their oral communication skills in a controllable but realistic environment. Metaverse promotes the replication of real-life scenarios, enabling students to participate in simulated dialogues, cultural exchanges, and interactive activities, enhancing their fluency, accuracy, and confidence in speaking English.

To fully grasp the potential of Metaverse in English teaching, people need to do further study and investigation in the future. Collaboration between educators, researchers, and technology developers is critical for improving teaching techniques, establishing effective assessment methods, and tackling the challenges of incorporating Metaverse into mainstream education.

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