



A Study of Building an Elementary School Language Classroom Based on AR Technology

Xue Zhang^(✉), Xin Xie, and Fugui Li

School of Computer and Information Science, Chongqing Normal University,
Chongqing 401331, China
wszxxxya@outlook.com

Abstract. Augmented reality (AR) technology, as a new form of information technology, can assist teachers in classroom teaching and promote innovative teaching modes, which is conducive to the development of new teaching models. The application of AR technology in teaching offers various benefits, such as making abstract learning content more tangible and visual, supporting situational teaching, and enriching the forms of learning activities, thereby improving learners' learning efficiency. This article will focus on the application of AR technology in Chinese language classroom teaching, analyzing its characteristics and current situation, and proposing a primary school Chinese language classroom design as a reference for promoting effective teaching.

Keywords: Augmented Reality · Primary Education · Improving Classroom Instruction

1 Introduction

Augmented reality technology, as a cutting-edge information technology, is having a profound impact on the education sector. In fact, China's 13th Five-Year Plan for National Education Development highlights the need to actively leverage innovative technologies such as artificial intelligence, virtual reality, and augmented reality to expand the scope of education and explore new teaching models [1]. This underscores the significance that China places on the integration of new information technology in education.

Therefore, the objective of this paper is to explore how information technology can be deeply integrated into classroom teaching to enhance teaching effectiveness. By analyzing the potential of augmented reality technology, this paper aims to shed light on how this technology can be harnessed to transform the traditional classroom into a dynamic and interactive learning environment. Through this approach, we hope to provide insights that will help educators unlock the full potential of augmented reality technology in the field of education.

2 The Current Development Status of Augmented Reality Technology in Education

Augmented reality technology overlays virtual information generated by a computer onto a real-world scene to enhance people's experience of the real world in terms of vision, hearing, touch, and other aspects [2]. It has the special features of real-time interaction and virtual-real combination. Integrating augmented reality technology into teaching content can reproduce teaching scenarios and facilitate the use of multiple senses such as hearing and vision, improving teaching effectiveness. In current Chinese language teaching classrooms, video playback software is still used, which can only leave short-term memory in students' visual memory. However, AR technology can present a flat surface as a 3D model, making the words in the textbook come to life and instantly "come alive," improving Chinese language literacy cultivation.

Research by Ye Yong et al. [3] showed that augmented reality technology has a positive impact on students' learning outcomes, with a comprehensive effect value of 0.57. The impact of augmented reality technology on learning effectiveness varies across different education stages, with the highest impact observed in preschool and primary school settings. Augmented reality technology's most prevalent characteristic in education is situational creation, presenting holographic images to students to create a relaxed and enjoyable learning atmosphere. This approach has been shown to promote brain development, increase student engagement, enhance the learning experience, and advance educational informatization.

3 The Issues Prevalent in Primary School Chinese Language Classroom Instruction

The new curriculum reform for compulsory education in Chinese language states that the Chinese language curriculum should fully leverage the support of modern information technology, expand the space for Chinese language learning, and improve Chinese language learning abilities [4]. Based on this, more and more researchers are applying information technology to the teaching process. Through reading literature, it has been found that there are the following problems in the use of information technology in primary school Chinese language teaching:

3.1 Neglecting the Incorporation of Information Technology with the Inherent Characteristics of the Subject

Current language textbooks cover the knowledge required by the new standards for students in language classes but have limited nurturing functions. Effective teaching modes, delivery methods, and the use of teaching aids largely determine how well and how students learn. However, in primary and secondary school language classrooms, most teachers still rely on traditional media technologies such as multimedia, television, and movies for teaching. These media technologies lack targeting and disciplinary focus, viewed as tools attached to the teaching process and cannot be deeply integrated into education. Consequently, they can only keep students' minds active for a short time, and student's interest in learning is difficult to sustain throughout the entire classroom.

3.2 Ignoring Personalized Learning

The language classroom plays a critical role in developing students' humanistic literacy, but the current model is dominated by teacher-led lectures and rote memorization, failing to consider the diverse feelings and perceptions of students towards language learning. Safeguarding each student's unique learning experiences and cultivating their interest in language is essential, inspiring each student's perception and appreciation of the subject matter, leading to a deeper understanding and mastery of the language as a humanities subject.

3.3 Insufficient Support for the Cultivation of Literary Literacy

Chinese language courses teach language, literature, and other subjects, improving thinking abilities through direct engagement with materials. Students develop language skills through extensive practice, appreciating its beauty and mastering its rules of use. Effective teaching focuses on students' individual needs, designing activities that inspire thinking, nurture curiosity and imagination, and encourage diverse learning methods. The goal of teaching is to empower students to develop thinking abilities and achieve their potential in language learning.

3.4 Neglecting the Cultivation of Students' Thinking Abilities

Developing logical thinking abilities in language is important for students to appreciate and comprehend the emotional aspects of texts, while improving their language organization and oral expression skills. However, elementary school teachers often prioritize completing the syllabus over creating a stimulating learning environment that fosters imagination and thinking skills. Language instruction tends to focus solely on academic performance, rather than developing students' thinking abilities, resulting in a lack of interest in learning.

3.5 Lack of Classroom Scenario Setting

The primary objective of language learning is to acquire the ability to use language in practical settings, foster patriotism, and instill appropriate values. Language instruction typically centers around textual materials and depends heavily on verbal communication by teachers to convey knowledge to students. This pedagogical approach places a high demand on students' attention, yet young learners are prone to distraction, and verbal explanations alone may not suffice to sustain their engagement. Traditional teaching methods often rely on a uniform approach that can be tedious, failing to capture the complexity and diversity of instructional content and situational dynamics.

4 The Supporting Role of Augmented Reality Technology in the Classroom

The education field has drastically changed due to information technology. The global education community is committed to providing inclusive, equitable, and quality education for all. Researchers in education are investigating how new technologies can

foster students' innovative thinking and abilities. The new Chinese language curriculum emphasizes cultivating correct values, a scientific attitude, and patriotism. Primary school is a crucial time for developing various abilities, and integrating logical thinking into various subjects is necessary. Traditional media may assist teaching, but they lack subjectivity and may not meet students' learning needs. Augmented Reality (AR) technology is a new tool that can enhance students' visual experience, offer interaction with virtual environments, cultivate spatial imagination, develop innovative thinking, and improve innovative abilities.

4.1 Improving Classroom Teaching Efficiency

To prioritize improving students' learning efficiency, effective integration of new information technology is crucial in the teaching process. Learning media has evolved from oral tradition and simple books to slides, movies, and television, all designed to assist teachers in improving learning efficiency. Classroom teaching is a cooperative process between teachers and students, requiring guidance, active thinking, and cultivation of logical thinking ability. A well-designed teaching plan is critical to achieving this goal. According to the dual-channel learning theory of multimedia, knowledge enters the sensory memory center through auditory and visual channels. Related auditory and visual representations must be converted to establish a connection between the two channels [5]. When students learn new knowledge, they receive it through visual and auditory channels, store it in their minds, search for existing knowledge and experiences, integrate new and existing knowledge, and build a complete knowledge system. For instance, upon hearing the word "cat," an image of a cat briefly appears, and existing knowledge is extracted from long-term memory, processed, and integrated with new knowledge to build a complete knowledge system stored in long-term memory (Fig. 1).

Using multimedia in teaching aims to stimulate learners' senses to improve their learning efficiency. However, excessive use of multimedia may cause aesthetic fatigue for students and lack of creativity in teachers' teaching design, resulting in formulaic teaching processes. The increasing application of augmented reality technology in education is conducive to diversified teaching design. Augmented reality technology's virtual-real integration and three-dimensional orientation can significantly enhance the visual effect, allowing learners to interact with objects in the virtual environment, enhance memory through hands-on operation, and improve their understanding of knowledge points.

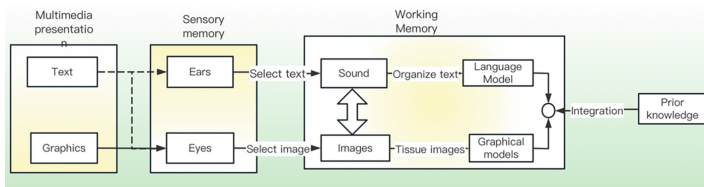


Fig. 1. Working principle of multimedia dual-channel learning theory

4.2 Diversification of Learning Resources

Developing teaching resources and digital textbooks is vital, including the exploration of digital transformation of paper-based textbooks and the creation of audible, visible, interactive, and practicable digital textbooks. Constructing a series of integrated multimedia textbooks that are scientifically designed, rich in resources, flexible in presentation, and suitable for the application of information technology is crucial [6]. The Chinese language curriculum emphasizes the unity of practicality and humanism, with a focus on developing students' language literacy. Teachers can integrate technology design into the teaching process, choose information technology resources based on teaching content, and use augmented reality technology to present teaching content in various ways, which has unique advantages over traditional teaching media. Students can scan relevant teaching tools on their terminals from their seats, and three-dimensional resources of teaching content will appear, enabling them to focus on the teaching content and improve their knowledge mastery.

4.3 Teaching Contextualization

Traditional Chinese language teaching mainly relies on textbooks. When describing the landscape of the country in the textbook, due to the uneven understanding of the text and the insufficient imagination of the students, it is impossible to fully convey the beauty of nature through words alone. Teachers can use audio and video to enhance students' sensory experiences, but it lacks interactivity. Augmented reality technology can break through time and space, replicate the text in the lesson in a 1:1 ratio, create a 3D scene, and let students see it in a realistic way. It allows students to enter nature in the classroom and feel the beauty of nature, which can also cultivate students' love for the country's landscapes. With the interactivity of augmented reality technology, difficult-to-understand content can be displayed during teaching activities, setting up a three-dimensional space, making it easier for students to understand and grasp the key points of knowledge.

5 Conclusions and Prospect

This article analyzes the current situation and problems in primary school Chinese language teaching and discusses the support role of augmented reality technology in the context of new information technology. The application of augmented reality technology in teaching can improve students' learning effectiveness and promote personalized learning while providing diversified resources for students and enhancing their mastery of knowledge points.

Despite the widespread attention augmented reality has received from educational researchers, most teachers only see it as a simple tool for content presentation and fail to integrate it with teaching and learning or design teaching resources that benefit student learning. To use augmented reality effectively, we must leverage its features and integrate it with teaching content to design effective teaching programs. Teachers should be willing to try new technologies, expand their teaching resources, and enhance their information

literacy awareness. Therefore, integrating augmented reality into the classroom teaching process, designing teaching programs that differ from traditional media, exploiting its teaching effect, and promoting its use require further exploration and research.

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