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Research on enhancing primary school Chinese oral expression with intelligent speech technology

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Abstract: Intelligent speech technology has emerged as a transformative tool in enhancing oral expression within primary school Chinese education. This study integrates key technological components, including voice data collection, recognition, evaluation, synthesis, and interactive feedback, to elevate instructional quality. The "Yi Dian Hui" system exemplifies this integration, demonstrating significant improvements in students' oral proficiency and classroom participation. The research highlights the potential of intelligent speech technology to foster a more interactive, personalized, and efficient learning environment.

Key words: intelligent speech technology; primary school Chinese; oral expression

1 Introduction

Oral expression is a fundamental aspect of language learning, particularly in primary education, where it plays a crucial role in shaping cognitive development and social interaction [1]. This paper investigates the role of intelligent speech technology in refining oral expression within the context of primary school Chinese education.

Effective oral expression not only facilitates the comprehension of textual content but also nurtures logical reasoning ability, thereby enhancing overall language proficiency. Moreover, it strengthens self-confidence, social interaction skills, and encourages active participation in classroom discussions. Thus, this methodology encourages an engaged learning mindset, pivotal for the well-rounded development of students.

The primary education stage is particularly critical for language acquisition, as young learners exhibit heightened linguistic sensitivity [2]. This makes it an ideal period for mastering pronunciation and cultivating proper expressive habits. Therefore, enhancing Mandarin instruction at this stage is crucial to developing accurate pronunciation and expression habits, which serve as a foundation for future academic success.

Despite the emphasis on oral communication in educational standard, challenges persist in students' Mandarin expression [3]. This study aims to leverage intelligent speech technology to enhance the standardization and quality of students' oral expression, offering innovative solutions for more efficient and personalized teaching practices.

2 Educational potential of intelligent speech technology

Intelligent speech technology introduces novel interactive approaches and personalized learning experiences in

education. It addresses several persistent challenges in traditional pedagogy, such as limited teacher resources, diverse student needs, and the delayed feedback process.

2.1 Voice data collection technology

Data collection for voice-driven applications forms the cornerstone of intelligent speech technology. This process employs highly sensitive microphones to record spoken expressions, subsequently transforming them into digital signals for further analysis and evaluation. This technology provides valuable data that enriches teaching and enables precise monitoring of student progress.

2.2 Speech recognition technology

Speech recognition technology transforms voice signals into text, allowing for real-time transcription of oral expressions. This process facilitates self-monitoring and correction, while also enabling teachers to assess pronunciation, grammar, and vocabulary accuracy, thereby promoting more effective language acquisition.

2.3 Speech evaluation technology

Speech evaluation technology offers standardized assessments of oral performance by analyzing various voice characteristics, such as pitch, fluency, and rhythm. By identifying pronunciation errors and expression issues, it provides valuable insights into students' language development, aiding teachers in delivering targeted interventions.

2.4 Speech synthesis technology

Text-to-speech technology transforms scripted text into audible speech, providing normative enunciation patterns and tailored educational content. This includes customized reading exercises, listening tasks, and other interactive resources that cater to individual learning needs, further enhancing students' engagement and comprehension.

3 Teaching model design and implementation

This section presents a comprehensive teaching model aimed at enhancing primary school Chinese oral expression ability. The model integrates intelligent speech technology with the essential processes involved in students' oral expression development.

3.1 The basic process of students' oral expression

Students' oral expression involves several stages: information reception, mental formulation of ideas, and the planning of oral production. These stages require a combination of attentional focus, semantic transformation, and articulatory coordination to produce clear and coherent speech.

3.2 The teaching process for oral expression

The teaching process for oral expression encompasses conveying information, activating concepts, monitoring language output, recognizing errors, and fostering classroom interaction. This process is organized into four key phases: preparation, implementation, assessment, and optimization.

3.3 Integration of intelligent speech technology and teaching process

The integration of intelligent speech technology into teaching involves both student and teacher activities, with each application serving a specific educational purpose. These technological interventions not only streamline the teaching process but also enhance learning outcomes by providing real-time feedback, promoting self-correction, and offering personalized support for students at varying proficiency levels.

4 Empirical study and findings

This empirical study utilizes the "Yi Dian Hui" system to assess the impact of intelligent speech technology on primary school students' Chinese oral expression. The system, with its user-friendly interface, facilitates the effortless recording of students' voices and concurrently empowers educators to gather and assess performance metrics.

4.1 Environment setup and equipment usage

Prior to the experiment, the "Yi Dian Hui" system was installed in the classrooms, along with signal receivers, chargers, and interactive devices for both teachers and students [4]. This setup ensured clear voice capture and provided the necessary infrastructure to support a variety of interactive classroom activities, thereby fostering increased student engagement.

4.2 Experimental design

This research utilized a randomized controlled trial methodology, involving two comparable classes: one functioning as the experimental group that utilized the "Yi Dian Hui" system, and the other serving as the control group which was subjected to conventional teaching methods. The hypothesis was that the experimental group would show significant improvements in the accuracy and fluency of their oral expression compared to the control group.

4.3 Experimental process

Both groups underwent baseline oral expression assessments. The experimental cohort embarked on an eight-week educational initiative that concentrated on vocal replication and the rectification of pronunciation in contrast to the control group that was subjected to traditional pedagogical methods. The initiative's activities comprised the auditory engagement with exemplary Mandarin articulations, practice in emulative speaking, and prompt evaluative responses from educators as well as the "Yi Dian Hui" platform.

4.4 Data collection and analysis

Quantitative data were collected through pre- and post-tests to measure changes in students' oral abilities. Qualitative data, including interviews, questionnaires, and classroom observations, provided deeper insights into the impact of the technology on teaching and learning processes.

4.5 Results

The participants in the experimental group exhibited a marked decrease in pronunciation mistakes and a noticeable enhancement in vocabulary utilization, grammatical accuracy, and the practical application of language when contrasted with the control group. These results underscore the effectiveness of intelligent speech technology in enhancing students' oral expression skills and facilitating more dynamic classroom participation.

5 Conclusion and recommendations

The integration of intelligent speech technology in primary school Chinese oral expression teaching has significantly enhanced students' oral proficiency and classroom engagement. By offering personalized feedback, standardized pronunciation models, and targeted learning resources, the technology addresses a range of learning needs, thereby optimizing instructional practices. This advancement not only improves the current educational landscape but also holds substantial potential for future enhancements in teaching strategies.

Looking ahead, future research should concentrate on the long-term impacts of intelligent speech technology in various educational settings. It is particularly important to explore its role in fostering educational equity, especially in under-resourced areas where it could play a pivotal part in bridging educational divides. In conclusion, the incorporation of intelligent speech technology into primary school Chinese oral expression teaching is a valuable educational advancement. As we continue to refine and integrate this technology into pedagogical strategies, we can expect a substantial elevation in educational standards and a more equitable distribution of learning resources across different regions.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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