EXPLORING THE APPLICATION OF GENERATIVE AI IN TPRS INTERNATIONAL CHINESE LANGUAGE TEACHING PRACTICE: A CASE STUDY OF INTERNATIONAL STUDENTS WITH ELEMENTARY CHINESE PROFICIENCY

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Abstract: Under the wave of global changes in educational intelligence triggered by generative AI technology, this paper aims to explore six strategies for TPRS international Chinese language teaching to realize digital reforms relying on generative AI by taking international students with elementary Chinese language proficiency as the teaching target, with a view to promoting the innovation and practice of artificial intelligence in the field of international Chinese language education.
Keywords: Generative; AI; TPRS; International Chinese language

1 INTRODUCTION

Under the background of rapid globalization, more and more foreign students choose to learn Chinese. For beginner level students, it is a challenge to learn Chinese effectively. In this process, the accelerated application of advanced generative artificial intelligence tools such as GPT-4.0 in international Chinese language teaching is objectively giving rise to innovations and changes in teaching methods, providing new possibilities for international Chinese language teaching. TPRS (Teaching Proficiency through Reading and Storytelling) is a story-based language teaching method that emphasizes the improvement of language proficiency through interesting stories and situations. This paper will explore in detail how generative AI tools can be integrated into TPRS international Chinese language teaching to help foreign students with elementary Chinese proficiency master Chinese more effectively.

2 SPECIFIC STRATEGIES OF GENERATIVE AI ENABLING TPRS PEDAGOGY

TPRS is a teaching method that emphasizes comprehension and communication, which is mainly realized through the steps of establishing meanings of vocabulary, establishing context, story inquiry, interactive practice, and combining reading and writing. The development of artificial intelligence technology provides many new tools for TPRS, and using these tools can optimize the TPRS teaching process and make learning more convenient, efficient and immersive. The following six aspects are selected to show the specific strategies of generative AI assisting instructional design.

2.1 Generating Word Lists

When the teacher creates a vocabulary list for a lesson's preparation, the target words in the lesson are selected, and ChatGPT-4 automatically and quickly labels these words with Pinyin and adds foreign translations according to the teacher's instructions, as shown in Figure 1. This greatly saves the teacher's workload of lesson preparation, compared with the previous manual input of Pinyin and translation and adjusting the format one by one[Case 1].

Figure 1 Vocabulary List by ChatGPT-4

2.2 Conversational Pre-teaching of Vocabulary

With the launch of the ChatGPT API, Quizlet released Q-Chat, a chatbot with the help of generative AI technology that specializes in helping students learn and memorize words. It provides students with a natural communication environment that allows them to interact with AI through a question-answer mode, as shown in Figure 2. In this mode, the teacher creates pre-study tasks before class, and students, according to their Chinese level choose their activity options from five items through the chat interface: teach me, practice with sentences, quiz me, story mode, and ask a question. Students will be able to practice and consolidate the vocabulary as if they were having a conversation with a friend, with real-time feedback and instant error correction. This mode greatly enriches the learning process, allowing students to memorize vocabulary in an easy and interesting chatting experience, fully prepared for participation in class activities and improving class learning efficiency[Case 2].
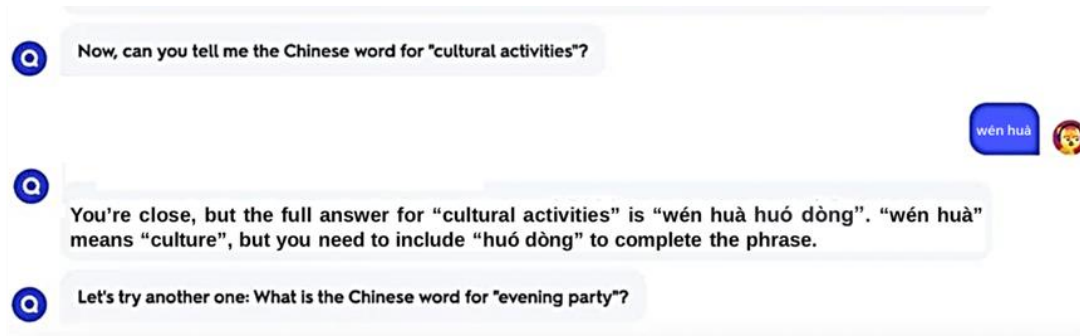

Figure 2 Conversational Pre-teaching of Vocabulary by Q-Chat

2.3 Real-Time Voice

In the tide of rapid development of artificial intelligence technology, in May 2024 OpenAI released an iterative version of GPT-4 - GPT-4o. It realizes a comprehensive processing enhancement of text, image, and speech on the basis of maintaining the same level of intelligence as that of GPT-4, especially the introduction of real-time speech function, which is able to realize seamless voice conversation, can respond to the conversation within the shortest 232 milliseconds, the average response time of 320 milliseconds, and is almost the same as human reaction speed, and support being interrupted at any time. In addition, it can identify different emotions, put them into context-appropriate conversations and responses, and "feel" the way of language organization and expression of emotions without a "mechanical" and "stuttering" sense. This is a revolutionary breakthrough in intelligent interaction capability, making the communication between AI and humans more natural and smoother, and moving towards the goal of "more like a human being", indeed. In August 2024, Iflytek benchmarked against the voice function of GPT-4o, by creating a Chinese interaction mode. It released the "Starfire Extreme Hyper-Anthropomorphic Interaction" technology, or "Starfire" for short. As the first product in China that directly realizes speech-to-speech end-to-end modeling, this technology is of great help in the field of education, providing new possibilities for speech interaction teaching, including the application of TPRS listening and speaking sessions.

2.3.1 Circular questioning

Circular questioning is one of the most effective ways to provide a large amount of comprehensible input for target language items in the TPRS story inquiry session. The teacher first says a sentence containing the target language, and then raises questions for different components of the sentence. For each component, the teacher usually uses four questions in three types of questioning: two general questions with affirmative and negative answers respectively, one alternative question, and one special question. By repeating the cycle in this way, the students' mastery of the target language is constantly reinforced, thus providing them with a large amount of comprehensible input. Circular questioning requires the teacher to be 100% enthusiastic in driving the students, to act like an actor, to attract students' attention and curiosity with exaggerated gestures, and this state needs to be sustained throughout the whole lesson. In addition, the teacher is required to do continuous, extensive, repetitive questioning of target sentences in the story within the limited class time, as many as tens or hundreds of questions asked, with the questions' keys repeated and "reported" to the whole class in a loud voice. This is undoubtedly a great challenge to the teacher's physical strength and throat. Meanwhile, for students, the high-density and similar circular questioning for the same vocabulary or language point can easily create fatigue or contempt [1]. Starfire can take over this heavy work in class, freeing the teacher partially or completely, and keeping students' attention by making it more interesting and dramatic. See case 3 for more details on how to do this[Case 3].

(1) Define the target sentence: the teacher says a target sentence, e.g., "Xiao Mei likes to eat dumplings," and asks Starfire to initiate questions about different components of the sentence.
(2) Comprehension: Starfire will use its natural language comprehension skills to understand the sentence. It will recognize the main elements of the sentence (e.g., "Xiao Mei", "likes", and "dumplings") and the relationships between these elements.

(3) Generate questions: Starfire generates audio questions based on the understanding of the sentence. For example, for "Xiao Mei", it can generate the following questions: "Does Xiao Mei like eating dumplings?" "Does Dasan like to eat dumplings?" and "Does Xiao Mei or Dasan like to eat dumplings?" and "Who likes dumplings?".

(4) Generate feedback: Starfire generates feedback based on the student's oral responses. If the student's answer is correct, Starfire can generate confirming feedback, and if the answer is wrong, it can correct the error.

(5) Circular Questioning: after completing one round of questioning and feedback, Starfire can start the following two rounds of questioning for "like" and "dumplings" respectively, thus realizing the goal of circular questioning.

Starfire's emotion expression is very rich and flexible, and it can control dozens of emotions, styles, dialects, and adjust the speed of speech according to the user's command in communication. Teachers can make choices from them, such as "ask the question in a sarcastic way" or "speak faster", and Starfire will ask students questions according to the teacher's instructions, thus increasing students' interest and motivation in answering questions.

Teachers should have a high level of control over the classroom in this session, pay attention to the command degree of students all the time, and change the way of questioning according to the actual situation. If the students in the creation of the story process are too chaotic, teachers have to maintain order in the classroom, and pull their thoughts back to class [2].

2.3.2 Reading aloud activities

In the TPRS reading session, in order to provide sufficient visual input and memorization time for the students' brain, students have to do a lot of reading aloud practice based on the story built by teachers and students, so as to complete the linguistic connection of sound, meaning, and writings, deepen their memorization of the three parts, and form their Chinese thinking way. In traditional class, teachers use various ways of reading aloud, such as teacher-led reading, whole class reading, group reading, relay reading, etc. However, such traditional ways are rather dull and rigid and it is difficult for students to have a happy experience. In order to cultivate students' interest in reading aloud, and then guide them to do longer reading and deeper understanding, teachers can implement the following reading aloud steps with the help of Starfire technology:

(1) Starfire leads the reading and students follow. Starfire can imitate the tone of characters such as the Monkey King, Crayon Shin-chan, and Peppa Pig, etc. This kind of free and flexible voice switching breaks the previous single form of only teacher-led reading, and greatly improves the students' participation and interest in reading aloud.

(2) When students are able to read aloud fluently, then change to the following forms of reading aloud:

i. Opposite voice state method: the opposite state held between Starfire and the students includes fast vs. slow, loud vs. low voice, clapping vs. stomping. For example, if Starfire reads a sentence quickly, the students should read the sentence slowly; if the teacher claps after Starfire reads a sentence, the students should stomp their feet after reading the sentence.

ii. Keyword emphasis method: when Starfire reads a certain sentence, it emphasizes the keywords of the sentence. The students have to recognize the keywords that are emphasized, and clap their hands when they read these keywords in the follow up reading.

iii. Sentence break method: students are to recognize where Starfire breaks a sentence and clap their hands at the breaks.

iv. Singing method: in March 2024, AI startup Suno introduced the V3 music generation model. The teacher enters a story text or target sentence, along with a simple song description, and then Suno generates a beautiful and catchy song. Starfire, the teacher and students can interpret the song by singing in unison, in duet, and in relays.

2.4 Intelligent Tests and Assessments

2.4.1 Generate tests

Teachers can use ChatGPT to make out a test and specify the problem requirements around the story content. For example, teachers can let ChatGPT automatically generate a number of test problems of reading comprehension or gap-filling, as well as answers to the them. More multidimensional problem types can be generated by adding supplemental prompts, e.g., reading comprehension problems contain three detail problems, one inference problem, and one main idea problem [3].

In addition to objective questions, ChatGPT can also make out open-ended questions that guide students to answer independently or in collaborative groups for discursive learning [4].

2.4.2 Automatic scoring and reviewing

Through artificial intelligence technology, teachers can understand the overall test performance within a few seconds after the test, keep track of students' learning in real time, check their weak points, and accordingly adjust the teaching strategy and carry out intensive training in class timely.

Whether subjective or objective problems, they can be automatically corrected with artificial intelligence tools. For objective problems, the teacher can input problems through the WeChat test applet, and then ask students to answer them within the specified time. When the answering time is over, the applet automatically scores the students and statistically analyzes the answering data of the whole class, and at the same time generates visual data charts, grade distribution and ranking lists; for subjective problems, the teacher can first initiate a group note in the WeChat class group, ask students to input their answers in the group note, then copy and paste the students' answers into ChatGPT, and issue instructions for ChatGPT to select the best few students and explain the reasons [5].

2.5 Generating Parallel Stories

ChatGPT can overcome the disadvantages of TPRS itself and assist teachers in generating parallel stories in large numbers. The TPRS pedagogy itself has the disadvantage of relying too narrowly on co-constructed stories, which results in two major pedagogical difficulties: (1) in terms of difficulty, as students' language proficiency rises, story building becomes more difficult, and the average teacher lacks the ability to consistently construct story outlines of ever-increasing difficulty. (2) Quantitatively, TPRS emphasizes comprehensibility, interest, and repetition, which cannot be achieved through traditional class instruction alone. Students need to receive a lot of comprehensible input and read a lot of interesting stories, and it is difficult for teachers to bear such a heavy burden individually [6]. As a language model for instant text output, ChatGPT can help teachers quickly and efficiently generate parallel stories with controllable difficulty and in line with students' characteristics by limiting vocabulary, sentence patterns, and stylistics according to students' answering test levels, interactions, and learning styles on the basis of existing reading materials. This largely solves the problems faced by TPRS Chinese teaching, such as the lack of teaching resources, the pressure on teachers to prepare lessons, and the high degree of flexibility in class.

2.6 Automatic Coloring

In order to address the difficulty of native speakers of English in grasping the tones and their relative pitches of Chinese characters, the TPRS method developed the TOP Pinyin spelling system. Teaching experience has shown that native speakers of English who consistently use the TOP Pinyin Spelling System to learn Chinese tones are more responsive and sensitive to the four tones of Chinese language, and are able to grasp the tonal range better and correct the foreign accents and tones effectively [8]. Teachers can use the online tool of conversion of characters into Pinyin to generate five different colors for Chinese characters in the reading materials based on different tones according to the color-coding principle of the TOP Pinyin method, so as to remind students to pay attention to reading the tones of the Chinese characters accurately and keep teachers away from the trouble of manually color-coding Chinese characters one by one[Case 4].

<p align="center">Huánghé yuǎn shàng bái yún jiān, yí piàn gū chéng wàn rèn shān.</p>

3 CONCLUSIONS

This paper takes the example of using the TPRS pedagogy to teach international students with elementary Chinese proficiency in the information age, preliminarily explores the effective methods of generative AI tools promoting the enhancement of the effectiveness of international Chinese language teaching, and tries to establish an intelligent pathway and strategy of international Chinese language education and teaching, to ensure that the students get a high-quality Chinese language education experience, and to realize the cultivation goal of improving learners' Chinese language proficiency. The iterative updating of generative AI technology has accelerated, allowing the educational concepts of "adapting teaching to the student's ability" and "student-centeredness" to become a reality. Only by keeping abreast of the digital reforms, taking the initiative to seek changes and opportunities, paying close attention to the learners' spiritual and personalized needs with the help of intelligent technology, and returning to the nurturing focus, can international Chinese teachers become the guides of intelligent technology and the leaders of Chinese language teaching, and help our country move forward from being a big country in language service to a strong country in language service.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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