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Integrating Task-Based Language Teaching and Generative AI: Design, Implementation, and Evaluation of the *CFLingo* Platform for Chinese Learning

(任务型语言教学与生成式人工智能的融合：*CFLingo* 中文学习平台的设计、实施与评估)

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Abstract: Recent advancements in generative artificial intelligence (GAI) have led to the development of GAI-integrated platforms to enhance foreign language learning. However, such platforms' effective design, development, and evaluation require a robust theoretical framework. This design-based study applies task-based language teaching (TBLT)—specifically the cognition hypothesis (CH) and the triadic componential framework (TCF)—to inform the design and implementation of *CFLingo*, a GAI-integrated Chinese language learning platform. The study addresses three key inquiries. First, the study examines how the cognition hypothesis can inform task sequencing within the platform. By progressively increasing task complexity, the platform scaffolds learners' cognitive load, guiding them from simpler to more challenging tasks in a structured and supportive way. Second, it explores the role of the triadic componential framework in enhancing the platform's adaptability through prompt engineering techniques, which optimize task conditions to address learners' varying proficiency levels and provide tailored feedback, creating opportunities for meaningful language practice. Third, the study evaluates the platform's effectiveness through open-ended responses and interviews with 26 college students who used *CFLingo* over a semester. The findings reveal that task sequencing and adaptive feedback enhanced task authenticity, improved performance, and enriched the learning experience. These insights offer valuable design and instructional implications for future GAI-integrated language learning platforms.

摘要: 近年来,生成式人工智能(GAI)的快速发展催生了多种旨在提升外语学习效果的GAI集成平台。然而,这类平台的有效设计、开发与评估需要一个坚实的理论框架作为支撑。本项设计型研究运用任务型语言教学(TBLT),特别是认知假说(CH)和三元成分框架(TCF),为GAI集成语言学习平台——智语学伴(*CFLingo*)的设计与实施提供理论指导。研究围绕三个核心问题展开探讨。首先,研究

探讨了认知假说如何指导平台中的任务序列设计。通过逐步增加任务复杂性，平台帮助学习者合理分配认知负荷，从简单任务逐渐过渡到更具挑战性的任务，实现结构化、支持性的学习进程。其次，研究探索了三元成分框架在平台适应性方面的作用。通过提示工程技术，平台优化任务条件，以适应不同水平学习者的需求，提供个性化反馈，为学习者创造有意义的语言练习机会。最后，研究通过对 26 名在一学期内使用 *CFLingo* 的大学生进行开放式问卷和访谈，评估了平台的有效性。结果显示，任务序列设计与适应性反馈提升了任务的真实性，改善了任务表现，并丰富了整体学习体验。本研究的结果为未来 GAI 集成语言学习平台的设计与教学提供了宝贵的启示与实践指导。

Keywords: Generative artificial intelligence (GAI), OpenAI API, human-centered platform, Task-Based Language Teaching (TBLT), Cognition Hypothesis (CH), Triadic Componential Framework (TCF)

关键词: 生成式人工智能、应用程序接口、人本主义平台、任务型语言教学、认知假设理论、三元要素框架

1. Introduction

With the rapid advancement of artificial intelligence, the integration of large language model (LLM)-supported generative AI tools (GAI), such as OpenAI's ChatGPT or Google's Gemini, into foreign language education has gained significant attention. Key features like "robust NLP capabilities, adaptability, and interactive elements" (Li, 2024, p. 26) hold great potential for enhancing foreign language pedagogy and second language acquisition (SLA) research.

As researchers have begun to consider using different types of AI tools in foreign language teaching, such as chatbots as conversational partners or writing assistants, concerns about "inaccuracies, bias, and plagiarism" (van Dis et al., 2023, p.224) persist. In the SLA process (Han, 2007), particularly during interactive tasks where much of the "negotiation and feedback" takes place, students often receive limited guidance from instructors while obtaining individualized feedback from AI. This is especially problematic when assigning interaction-based homework using tools like ChatGPT Web Application. It has become increasingly difficult for teachers to monitor students' interactions with AI, track their progress, and address potential issues such as misinformation or ethical concerns. Instructors need a secure platform to safely store student data, enabling effective follow-up feedback and assessment. Building on this need, a key question emerges: How can a secure, 'human-centered' platform (Yan, 2024) be designed to foster collaboration between teachers and AI in achieving teaching goals? OpenAI's Application Programming Interface (API) offers a promising solution. Compared to the ChatGPT web app, the API is more adaptable to classroom use, offering greater customization, support for multiple accounts, enhanced security, and better prompt control. These capabilities provided the researchers

with the possibility and feasibility of developing a GAI-integrated language learning platform using OpenAI's API, which was subsequently named *CFLingo*.

The next challenge that needs to be addressed is aligning the technical design of a GAI-integrated language learning platform with foreign language curriculum that adopts Task-Based Language Teaching (TBLT). TBLT is a research-based pedagogical framework. It is functionally oriented but has psycholinguistic validity. It emphasizes form, meaning, and use, aiming to help learners perform meaningful, real-world tasks, known as target tasks. Pedagogic tasks serve as foundational steps to develop language skills required for target tasks (East, 2021). Task-Based Language Teaching (TBLT) emphasizes the importance of sequencing tasks to progressively develop learners' cognitive abilities, thereby supporting both language acquisition and performance. In response to this need, Robinson introduced the Cognition Hypothesis (CH) and later the Triadic Componential Framework (TCF) (Robinson, 2001b, 2003b), which provides a detailed taxonomy of task characteristics. Both CH and TCF play a pivotal role in TBLT by illustrating how increasing task complexity—while accounting for cognitive, interactive, and learner-related factors—can enhance second language development. Incorporating pedagogical theories such as CH and TCF is essential for guiding the design and development of *CFLingo*—a generative AI-enhanced Chinese language learning platform that seamlessly integrates these principles throughout its development process.

This paper explores how CH and TCF can be applied to design and develop a GAI-integrated Chinese language learning platform. Specifically, this exploration intends to: (a) present how sequence tasks informed by CH can be utilized to design a GAI-integrated learning platform, (b) explore how TCF can be applied via prompt engineering on the GAI-integrated learning platform to create adaptive learning experiences, and ultimately address the research question of (c) how effective the overall design of the GAI-integrated language learning platform is.

2. Literature Review

2.1 The Growing Role of Generative AI in Language Teaching

Since GAI tools, like ChatGPT, were first released to the public, language instructors and researchers have moved through stages of concern, from attempts to ban GAI applications and eventually toward recognizing the benefits of these changes. They are now acknowledging and embracing the opportunities presented by this exciting new technology, particularly conversational agents like ChatGPT (Hong, 2023). In the past two years, researchers have taken initiatives to conduct empirical and theoretical studies in foreign language teaching, including Chinese language instruction. These studies range from examining students' experiences and perceptions of ChatGPT 3.5 (Xiao & Zhi, 2023), exploring pre-service teachers' insights into AI conversational chatbots (Belda-Medina & Calvo-Ferrer, 2022), and evaluating the suitability of ChatGPT-generated dialogue materials for EFL learners (Young & Shishido, 2023), to more extensive research on

ChatGPT's capabilities in assessing CFL learners' writing performance, generating teaching materials, and creating teaching tasks and assessments (Li et al., 2024).

As Han (2024) summarized, three research areas are emerging concerning ChatGPT's affordances for language learning: (1) ChatGPT's capabilities, such as adaptability and personalization in delivering tailored learning experiences, though the specific affordances that optimize learning outcomes remain underexplored (Han, 2024); (2) how learners leverage these affordances to enhance language skills, with a research emphasis needed on "the interaction between ChatGPT and language learners" (Han, 2024, p. 303); and (3) the role of human agency in guiding and mediating the learning process during AI chatbot interactions (Han, 2024). These research areas provided implications for future GAI integrated platform development and implementation.

2.2 Diverse Voices and Debates in TBLT

A task-based syllabus is an instructional method that structures learning around practical, real-world tasks, such as ordering a meal, for students to complete in the classroom. It consists of a sequence of tasks to foster learners' communicative skills (Pica et al., 1993). By embedding systematic language learning within practical and communicative tasks it supports structured SLA. Through fostering interaction and cognitive engagement, it aligns with SLA's focus on iterative and meaningful language use (Han, 2018). This approach enhances structured SLA by integrating real-world practice with theory-driven language instruction.

The classification of tasks in TBLT has evolved significantly over the years. Pica et al. (1993) established an early typology of communication tasks. Skehan (1998, 2003) expanded this categorization by introducing a taxonomy identifying task characteristics influencing linguistic demands, such as code complexity, cognitive complexity, and communicative stress. This framework highlighted how varying task features could affect learners' language performance (Skehan & Foster, 2001). Building upon these earlier models, Robinson developed the Triadic Componential Framework (TCF; 2007a) that offers a vital taxonomy for understanding task characteristics in TBLT by categorizing task demands into three main areas: complexity, condition, and difficulty.

The most extensive and active exploration of cognitive task complexity over the past few decades has taken place within the TBLT domain. Among these discussions, the debate surrounding Skehan's Limited Capacity Hypothesis (LCH) and Robinson's Cognition Hypothesis (CH) offers important insights into TBLT and its impact on L2 production. Skehan (1998) posited that learners face a trade-off among complexity, accuracy, and fluency (CAF) when performing tasks due to limitations in attentional resources and working memory. He argues that fluency often takes precedence during meaning-based tasks, potentially compromising complexity and accuracy. This suggests that task design must promote balanced language development, ensuring learners can effectively engage with all three aspects of language use (Skehan, 1998).

Conversely, Robinson's CH emphasizes that increasing cognitive demands within pedagogic tasks can enhance interlanguage development by encouraging learners to focus on L2 features necessary for expressing new cognitive distinctions. His study shows a correlation between task complexity and the syntactic complexity of task-doers' or L2 learners' speech production (Han, 2018). Robinson (2001a, 2003b) argues that this heightened focus leads to increased uptake and accelerates grammatical development. Furthermore, manipulating task complexity—such as reducing planning time—can improve learners' access to their current L2 abilities and enhance the likelihood of transferring learned skills to real-world tasks (Long, 2014).

Despite the theoretical foundations of both Skehan's Limited Capacity Hypothesis and Robinson's Cognition Hypothesis, empirical studies have yielded inconsistent results regarding the interplay of accuracy, complexity, and fluency in task performance. Many findings do not achieve statistical significance or reveal unexpected trends (Long, 2014). To address these gaps, this study proposes a GAI-integrated language learning platform that sequences tasks based on their complexity. By leveraging the adaptive capabilities of generative AI tools, the platform tailors task conditions to accommodate learners' perceived difficulty levels, ultimately fostering a more effective and personalized language learning experience.

2.3 The Role of GAI in TBLT

Prior to GAI, SLA literature “barely scratches the surface” (Han, 2024, p.302) of conversational agents (CAs) used in TBLT. Previous studies primarily concentrated on learners' perceptions of experiences with AI tools, revealing that students enjoyed task-based interactions with CAs. Learners favored CAs that offered both audio and visual feedback, but the research mainly examined L2 speaking and listening skills without exploring broader learning impacts, such as reading and writing, for Chinese learners. Tasks were selected from readily available CAs like Google Home Hub and Amazon Echo, leading to insufficient development of tailored tasks that meet learners' specific needs. The researcher indicated “only a handful of studies have redesigned the dialogue system to fit into specific learning contexts or redesigned the tasks for specific learning purposes” (Xiao et al., 2023, p.12).

With the emergence of GAI, several researchers have conducted empirical studies on task generation within TBLT. It is capable of generating materials across various types and difficulty levels, including a wide range of tasks (Li et al., 2024). Since GAI tools provide a “Human-machine” interface for each language learner, how can tasks be sequenced and designed so that all learners can do the same task while getting individualized interaction with AI. It becomes essential to have a deeper exploration of GAI's role in Instructed Second Language Acquisition (ISLA) which TBLT rooted in (Han, 2024). Existing literature has not yet systematically investigated the integration of GAI tools within TBLT curricula. There is a research gap on whether TBLT theories, specifically Robinson's Cognition Hypothesis and Triadic Componential Framework, can still guide the Chinese curriculum design and implementation in this new GAI-integrated language learning environment. This study will address this research gap by applying CH

and TCF to GAI-integrated language learning platform design, emphasizing the pedagogical task classifications and sequencing.

2.4 Theoretical Foundation for GAI-Integrated Language Learning Platform

To explore how TBLT can guide the design of GAI-integrated Chinese language learning platform, this study focuses on Robinson's Cognition Hypothesis (CH) and Triadic Componential Framework (TCF), which underpin its rationale and research design.

The CH in TBLT suggests that “sequencing tasks from simple to complex creates optimal conditions for practice” (Robinson, 2003b, p.55), as it maximizes the real-world target task requirements (Robinson, 2001a). Robinson clarifies task complexity along two dimensions (Figure 1): resource-directing and resource-depleting. As shown in Figure 2, for both individual and interactive tasks, moving from simple to complex along the resource-directing dimension may reduce fluency but enhance accuracy and complexity in learners' language use. On the other hand, along the resource-depleting dimension, when learners face less planning time, unfamiliar tasks, or multiple simultaneous tasks, the skills they develop are more likely to transfer effectively to real-world performance (Long, 2014). Thus, the Cognition Hypothesis argues that pedagogic tasks should be sequenced based on increasing cognitive complexity (Robinson, 2005). This principle serves as the first foundation for designing task sequences for the GAI platform within TBLT contexts.

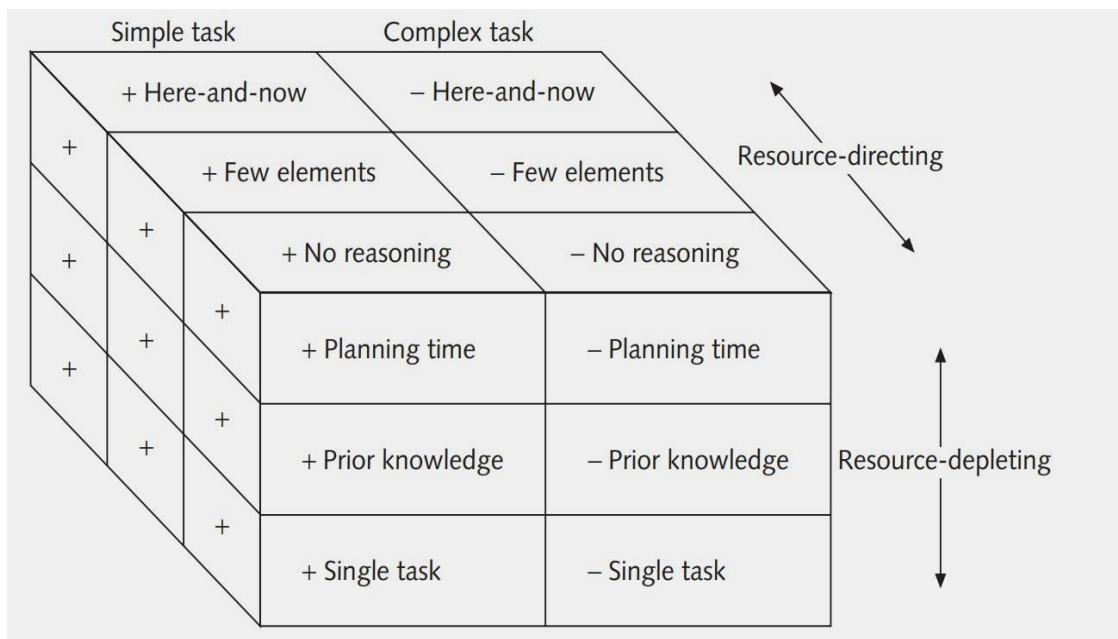


Figure 1 Resource-Directing and Resource-Depleting Dimensions of Task Complexity (Robinson, 2003a, p648)

monologic tasks	
simple	complex
+ fluency, - complexity, - accuracy	- fluency, + accuracy, + complexity
interactive tasks	
simple	complex
+ fluency, - accuracy, - comprehension checks/ clarification requests	- fluency, + accuracy, + comprehension checks/ + clarification requests

Figure 2 Proposed Effects of Task Complexity on Accuracy, Fluency and Complexity along Resource-Directing Dimensions (Robinson, 2001a)

Robinson's (2001b) Triadic Componential Framework (TCF) is a practical categorization of task characteristics. As outlined in Appendix 1 (Robinson, 2006), he identifies three categories of task demands crucial for real-world task performance: task complexity, task conditions, and task difficulty (Robinson, 2011). While Robinson emphasized sequencing pedagogic tasks based on cognitive task complexity, he also highlighted that "successful learning and performance result from the interaction of different aspects of task demands" (e.g., complexity level and task conditions) with learners' ability profiles, which influence their perceptions of task difficulty (Robinson, 2001c, 2002b).

TCF taxonomy forms the second foundation of this study. Within a single unit or lesson, the same task may produce varying outcomes depending on the conditions under which it is performed. This underscores the importance of considering both task conditions and task difficulty during task implementation. Each learner has a unique "aptitude profile"—a combination of natural abilities or capacities influencing their success in language learning. According to Robinson's Aptitude Complex/Ability Differentiation framework (Robinson, 2007a), these individual differences can be linked to the Cognition Hypothesis, which suggests that tasks can be designed with varying complexity levels to align with or challenge learners' aptitude profiles. By adjusting task conditions—such as learners' proficiency levels, available resources, and the equality of participant roles—educators can tailor tasks to match learners' aptitudes better. This approach enhances cognitive engagement and optimizes learning outcomes. These principles guide the present study's task design.

A prompt-engineering approach was employed in each task design to achieve this, enabling the generative AI to produce outputs aligned with learners' aptitude profiles. This approach establishes optimal task conditions that support second language (L2) acquisition by promoting fluency, accuracy, and complexity in learners' language performance.

2.5 Purpose of the Study

The challenge of aligning learners of varying proficiency levels with tasks that best match their abilities—thereby maximizing learning and performance—remains underexplored and infrequently applied (Robinson, 2001c). Building on the CH and the TCF, this study introduces a GAI-integrated foreign language learning environment, *CFLingo*, designed to address the core issues of effective task sequencing for acquisition and instructional adaptation to meet learners' needs. This exploration focuses on:

- a) (a). Understanding how the Cognition Hypothesis (CH) can guide task sequencing design within *CFLingo*;
- b) (b). Investigating the role of the Triadic Componential Framework (TCF) in optimizing the *CFLingo*'s adaptability.

Finally, based on the integration of CH and TCF, the study intends to address the following research question:

- c) How effective is *CFLingo* in improving task performance and enriching the learning experience?

3. Development of the GAI-integrated Language Learning Platform—*CFLingo*

3.1 Platform Background and Overview

CFLingo, 智语学伴 in Chinese, was designed and developed at Lehigh University to provide a virtual language partner that supports reading and writing practice while connecting to in-class Task-Based Language Teaching (TBLT) tasks. The platform was designed for a diverse group of learners, including heritage speakers and non-native students, all of whom have passed HSK Level 3 but exhibit varying strengths and weaknesses—particularly in reading and writing—due to limited opportunities for real-time conversations with native speakers. The platform leverages OpenAI's GPT large language model to create adaptive and authentic learning experiences tailored to each student's proficiency level and individual learner profile. By aligning AI-driven tasks with the chapter-based syllabus, *CFLingo* ensures meaningful engagement that complements classroom instruction. Additionally, the platform's adaptability allows students to practice skills in a way that reflects real-world language use, bridging the divide between structured learning and authentic application while fostering individualized growth.

Figure 3 presents the homepage of *CFLingo*: There are two to three pedagogic tasks designed for each chapter scaffolded to align with the CH, covering a total of ten chapters in *Integrated Chinese* (Volume 3), which is the leading textbook adopted at college-level 3rd-year class across the US. During the five-day teaching cycle for each chapter, students are given designated time to interact with *CFLingo* during class. Each task typically takes about half an hour to complete, ensuring that all students engage with the same pedagogical task related to the chapter. The instructor can monitor progress in real-time, either in the

classroom or by reviewing chat logs in the "My Chats" section. While instructors have access to all chat records, students can only view their own chat history for future reference.

Looking for the Perfect Language Partner? Meet CFLingo AI!

智语学伴 (CFLingo) 秋季 (Fall) 春季 (Spring) 我的聊天记录 (My Chats)

智语学伴 - CFLingo

[中文听说读写 第三册 秋季](#)
[Exercises for Integrated Chinese Volume 3, Fall CHIN 115]

[中文听说读写 第三册 春季](#)
[Exercises for Integrated Chinese Volume 3, Spring CHIN 116]

[我的聊天记录](#)
[My Chats - Archive of your past chats with CFLingo]

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Figure 3 CFLingo Homepage 智语学伴

CFLingo offers task-based instructional support activities (see Figure 4), including sentence generation, sentence rearrangement, language error detection, email responses, role-playing or debating with a virtual language partner, and describing or narrating events. As students progress, the focus gradually shifts from developing interpretive reading and interpersonal communication skills to enhancing presentational writing abilities, such as essay drafting and revision. Students engage with the platform weekly, completing tasks aligned with the chapters they are studying. A dropdown menu on the interface allows students to easily switch between tasks, ensuring smooth navigation and flexibility.

For example, in Chapter Three, themed “At the Restaurant,” students begin with a “sentence generation” task, where they construct complete and meaningful sentences using words or phrases provided by *CFLingo*. This initial activity focuses on language forms by identifying student errors and prompting revisions if the sentence is incorrect. Students are encouraged to draw from a word bank, incorporate more complex structures, or create sentences with multiple clauses. Once students demonstrate linguistic readiness, they advance to a more situational task—engaging in a conversation with *CFLingo*. In this scenario, the AI takes on the role of a restaurant owner, while the student acts as a consultant recommending improvement plans in exchange for free meals. Recommendations may address areas such as kitchen hygiene, restaurant décor, service quality, menu options, or target customers. As shown in Figure 5, students are provided with word banks and templates to assist in generating further prompts in Chinese.

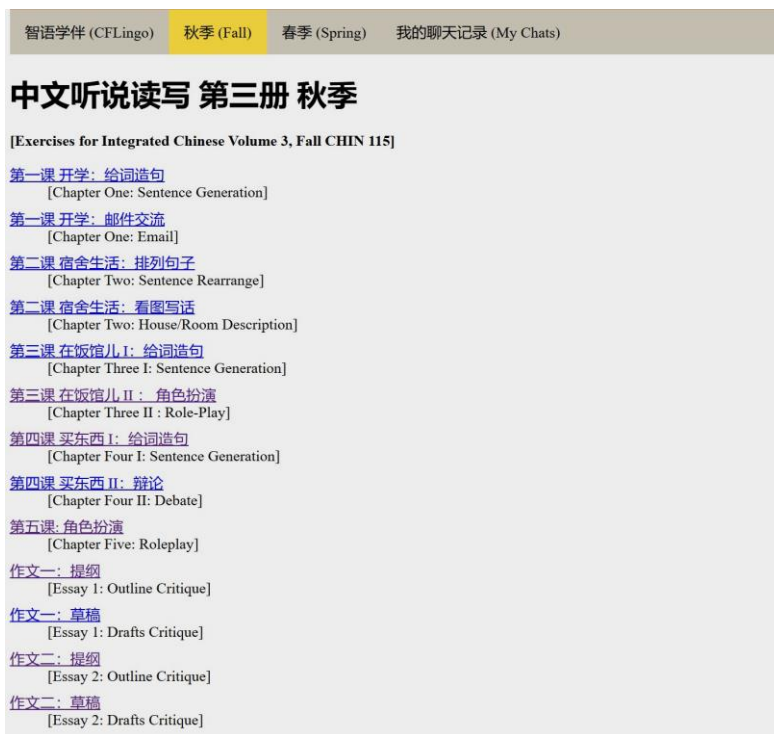


Figure 4 Sample Tasks List of *CFLingo* 智语学件

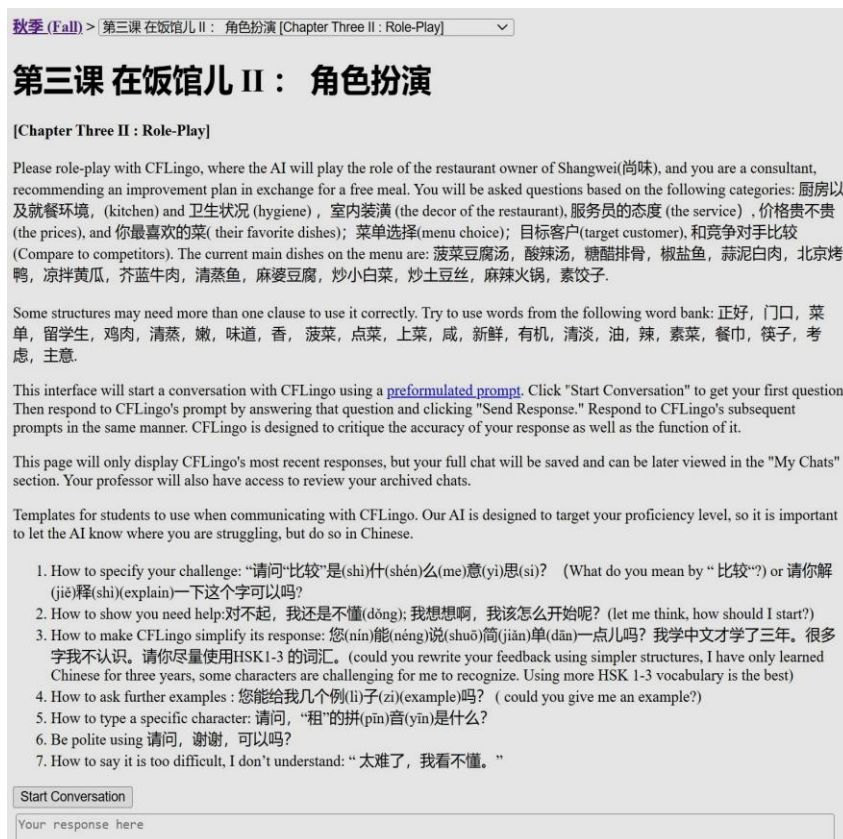


Figure 5 Sample Task Interface of *CFLingo* 智语学件

A key requirement for these tasks is that students must communicate with AI entirely in the target language, Chinese. After completing the two scaffolded activities with *CFLingo*, students present a live restaurant review in class, focusing on descriptive and narrative language to comment on the same categories covered in the conversation. Finally, students write a detailed restaurant review in paragraph form as part of their chapter quiz. Overall, *CFLingo's* design for each chapter, in alignment with classroom instruction, guides students' language development from dynamic, interpersonal communication to structured, presentational skills, both in spoken and written Chinese. This AI integrated curriculum reflects the different linguistic demands of each mode of communication—interpersonal, role-play tasks emphasize spontaneous, interactive language, requiring features such as question forms, negotiation strategies, and turn-taking, while presentational tasks like narrating or describing rely on structured, cohesive language for extended discourse.

Figure 6 shows an example of a task interaction in *CFLingo*—News Generation and Discussion. When students access this activity, instructors guide them through the task explanation at the top of the screen, above the dialogue box. Once students understand the task requirements, they can click Start Conversation to interact with *CFLingo* and complete all the subtasks on the page. As shown in this sample, while all students work on the same task, each receives a unique AI-generated news piece and engages in an individualized discussion about it with the AI.



The screenshot displays the CFLingo interface for a task titled "第七课 电脑和网络 II: 新闻生成和讨论" (Chapter Seven II: News Generation & Discussion). The main content is a news article in Chinese: "中国学校推出新教育计划" (Chinese schools launch new education plan), dated 2024年1月15日. The article discusses a plan to enhance students' practical abilities and innovation by adding programming, art, and environmental courses. Below the article, there is a "Send Response" button and a text input field. The "MOST RECENT RESPONSES" section shows a conversation between the user and CFLingo. The user asks for help, and CFLingo responds with encouragement and offers to help with news writing or Chinese learning. The user then asks for help with a sentence, and CFLingo provides a corrected version and explains the corrections. Finally, the user asks about safety in chemistry experiments, and CFLingo provides detailed safety instructions, including wearing goggles and gloves, and using proper disposal methods.

Figure 6 Sample Task Chat Logs of *CFLingo* 智语学伴

3.2 Integration of Cognition Hypothesis (CH) on *CFLingo* for Task Sequencing Design

This section explicitly demonstrates the integration of the Cognition Hypothesis (CH) framework in supporting task sequencing design. In line with Robinson's Cognition

Hypothesis (2001b, 2005, 2007a), pedagogic tasks should be sequenced incrementally based on their cognitive complexity. In this study, the *CFLingo* platform comprises 10 chapters and 4 essay assignments delivered across the Fall and Spring semesters, aligning with the curriculum design of *Integrated Chinese, Volume 3*. The selected pedagogic tasks illustrated in Figure 7 represent typical task types for each semester. These tasks are structured and scaffolded to support learners in achieving the target task of “writing descriptive or argumentative essays.” As shown in Figure 7, cognitive complexity progression sequences these tasks accordingly. Figure 8 further depicts cognitive development based on the revised Bloom’s Taxonomy (Anderson & Krathwohl, 2001) and reinforces the Second Language Acquisition (SLA) process, encompassing Input, Negotiation, Feedback, and Output (INFO) as outlined by Han (2007).

The first task, situated at the bottom of the pyramid in Figure 6, involves recalling facts from the text or vocabulary provided by AI. This task corresponds to the “Remember” stage and is considered **input**.

Task 2 progresses to sentence generation and error detection, which falls under the “Understand and Apply” stages and are part of **intake**.

In Task 3, students focus on comprehending emails or other readings, engaging in understanding, applying, and analyzing the material. At this stage, comprehensive input and intake take place. Task 4 introduces role-playing or debating with AI on topics of interest. Here, students practice applying their knowledge and negotiating with AI to clarify linguistic features or **feedback**, ensuring mutual understanding. This task begins to incorporate “reasoning.”

Task 4 also includes describing or narrating a series of pictures in paragraphs, which involves applying, analyzing, and evaluating the material. When AI provides feedback on students’ descriptions or narrations, **negotiation** occurs. Students must further explain or adjust their responses to reach mutual comprehension and facilitate learning.

The subsequent task involves essay outlining and draft critique. This multi-step process supports learners in writing essays, moving from constructing an outline to producing a first draft and eventually a final draft. Through the stored chat logs on *CFLingo*, instructors collaborate with AI to confirm feedback (see Figure 8), emphasize or further explain AI suggestions, and facilitate communication. This process involves extensive clarification, confirmation, and **negotiation** until learners produce the final **output**—well-crafted essays—thus achieving the target task.

As indicated in Figure 7 (Han, 2007) and Figure 8, throughout this guided language acquisition process, task conditions are optimized through negotiation and feedback.

The progression of these pedagogic tasks demonstrates a gradual increase in complexity, preparing students to advance from sentence generation to unprepared role-play or debates with AI, then to composing longer discourse, and ultimately producing well-developed essays. As shown in Figure 7, both the resource-directing and resource-

depleting dimensions involve an increasing number of components. With each level up, more prior knowledge, additional steps, and more elements are needed. The progression transitions from tasks requiring minimal reasoning to those involving extensive reasoning, culminating in essay writing. In the final stage, students must adopt various perspectives and articulate their opinions to compose their essays. This step reflects the "full complexity level of the target task(s)" (Long, 2014, p. 226).

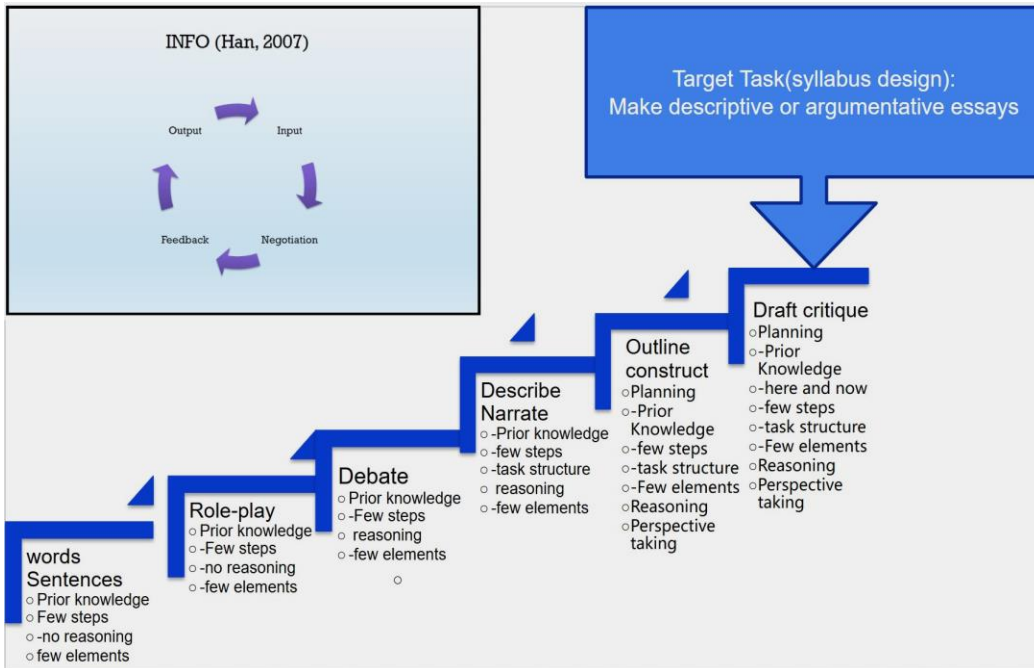


Figure 7 Cognitive Complexity Progression in the Sequencing of Pedagogic Tasks adapted from CH and TCF

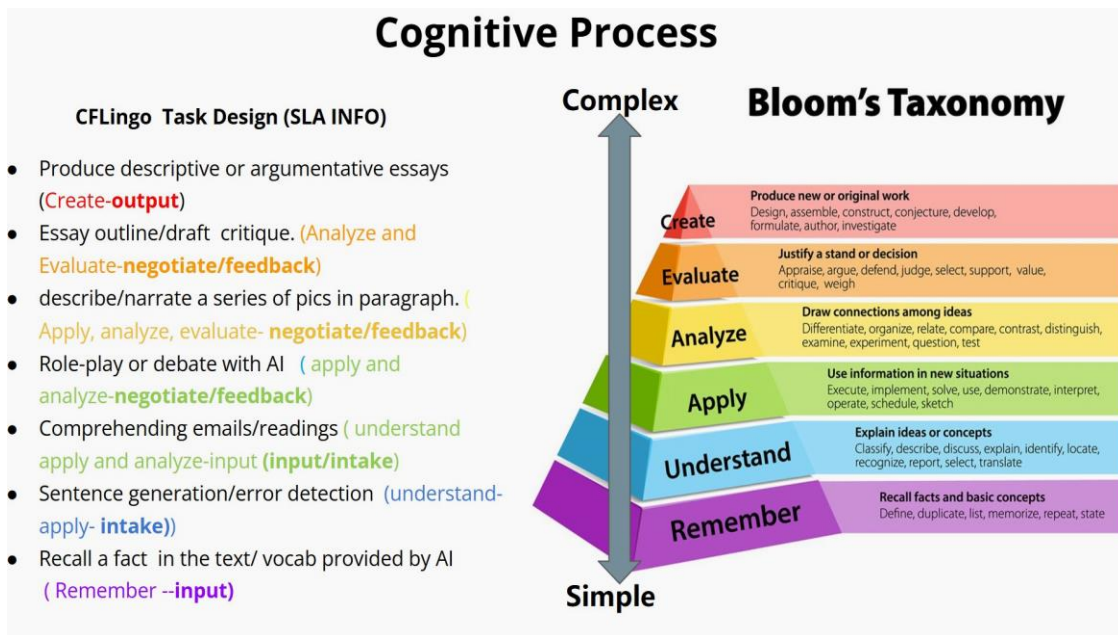


Figure 8 Cognitive Taxonomy in CFLingo Task Syllabus Design Adapted from “Revised Bloom’s Taxonomy (Anderson & Krathwohl, 2001)

An implication for overall task-based syllabus design is that instructors need to gradually increase the complexity of pedagogic tasks, not linguistic complexity. The *CFLingo* task syllabus aligns with the *Integrated Chinese* (IC) curriculum, making it easier for instructors who use the same curriculum or textbook to adopt the *CFLingo* model and effectively reach more Chinese language learners. This demonstrates the generalizability of *CFLingo*.

The CH in task-based learning indicates that as tasks increase in complexity, individual variations in cognitive abilities, such as aptitude and available cognitive resources, play a more crucial role in shaping performance and learning outcomes. This suggests that learners with higher cognitive resources or greater aptitude are better equipped to handle more demanding tasks, leading to improved performance and more effective learning (Robinson, 2003b). The following section further discusses how to leverage task conditions and consider learners' individual variables to reduce the perceived difficulty and enable success in the target tasks.

3.3 Integration of Triadic Componential Framework (TCF) into *CFLingo* for Adaptivity Design Through Prompt Engineering

3.3.1 *CFLingo* Platform System Development

In Fall 2023, the Center for Innovation in Teaching and Learning (CITL) within Lehigh University's Library and Technology Services (LTS) began developing local web interfaces using the application programming interface (API) provided by OpenAI, the developer of the ChatGPT web application and the underlying GPT large language model (LLM) that powers it. This API allows developers to directly interact with the various versions of the GPT LLM. At first, this development primarily sought to solve access issues. The most recent versions of the GPT model were only available through the ChatGPT web application for users paying a monthly subscription fee. Providing a subscription to this service for every student in a class for an entire semester presented a significant barrier. In contrast, a local application could use the most recent GPT model via OpenAI's API at a fraction of the cost. Also, integrating various GPT models, like GPT-3.5, GPT-4.0, and most recently, GPT-4 Omni, allows for tailored solutions that meet diverse teaching needs.

Focused on solely providing access to the latest versions of the GPT LLM, the initial interfaces were relatively simple and provided an open-ended, sandbox-like environment for students to explore. These local interfaces used client-side JavaScript to store, process, and format student-entered text into a format that could be sent via the API to the GPT LLM. This message was then sent to a local server-side PHP backend that would add the API Key credentials that tied the request to CITL's account with OpenAI for billing. This PHP backend could also store the outgoing and ingoing messages in a local MySQL database and associate them with the current user's account, allowing for detailed analysis and progress tracking without OpenAI retaining data, thus ensuring student privacy.

Despite the open-ended focus of these initial local interfaces, the development team also recognized the potential for special-purpose interfaces that could supply additional processing of text sent to and from the large language model to provide scaffolding to students for specific tasks. As students progress to the third year of the Chinese program, the need for focused practice in reading and writing becomes increasingly critical, providing a strong use case for developing a more scaffolded, localized interface to support their learning. Therefore, the development team extended the scope of their work to include the application that would come to be known as *CFLingo*. The researchers and developers used the previously mentioned non-scaffolded sandbox interface to design prompts that would elicit an interaction with the AI that met the needs of a specific exercise. By trial and error, an initial prompt would emerge from this process to seed appropriate interaction between the AI and a student. Then, the developer would create a customized scaffolded interface that would provide the GPT model with this seed prompt before the student began directly interacting with the AI. This ensured all students worked on the same tasks and seamlessly integrated activities into lessons, allowing them to simultaneously engage in unique, individualized conversations. Furthermore, as previously stated, the resulting interactions are saved to a local MySQL database, allowing the instructor to access all conversations and the individual students to review their own, streamlining data collection and allowing the monitoring of student progress.

3.3.2 The Role of Prompt Engineering Within the TCF Framework

For each initial seeded prompt integrated into the *CFLingo* interface and sent to the GPT LLM using OpenAI's API, researchers developed a structured template (see Figure 9) to systematically organize content. This design enabled *CFLingo* to provide students with clear instructions, respond to inquiries, correct responses, offer constructive feedback, and critically adapt to varying proficiency levels while ensuring that students could progress effectively. Figure 9 provides an example prompt, color-coded to correspond with the different components shown in Figure 7 (Cai, 2024). For instance, the prompt informs *CFLingo* that it is assuming the role of a CFL teacher, corresponding to the "Roles" component, highlighted in blue.

Roles	Settings	Task/outcome	Procedure	Tailor	Feedback	Follow-up
<p>Example: You are a Chinese as Foreign Language (CFL) teacher who will prompt English speaking students in a 3rd year of CFL class to make a complete and meaningful sentence in Chinese from a word or phrase that you provide them... provided word list. Restrict all of the words in your chats to this explicit list of 600 HSK 1-3 words.....Critique students' errors and ask them to redo the sentence if it is incorrect, give further feedback and then move on to the next word or phrase to make a sentence from. Encourage them to use words from the following word bank...</p>						

Figure 9 Prompt Engineering Color-Coded Template

Prompt engineering refers to the practice of crafting meticulously designed, text-based prompts to interact with chatbots and other generative AI tools, aiming to generate desired outputs across text, images, audio, video, or a combination of digital media (Knoth et al., 2024; Velásquez-Henao et al., 2023). Each pre-formulated prompt on *CFLingo* represents a specific task design. Comparing these to traditional TBLT task design features (see Table 1), *CFLingo* not only sequences tasks in order to increase cognitive complexity but also emphasizes interactive factors. For instance, AI-human interaction on *CFLingo* is a dynamic two-way process where the AI adjusts its proficiency slightly above or below the learner's current HSK 3 level (i+/-1), focuses on implicit feedback, and maintains equal status with the learner to foster engagement.

Table 1 Key Features comparison between *CFLingo* Task and Traditional task (Candlin, 1987)

Key features of TBLT tasks (traditional)	Each <i>CFLingo</i> Prompt/task design	Interactive factors Task condition	Affective Factors/ability variables Task difficulty
Goal/expected outcomes:	Goal/outcome: authentic language in use in real-life situations Real-life functional/communicative goals such as role-play with restaurant owner	Situational Authenticity Open solution Divergent solution	Aptitude: practical solutions and strategic language use.
Condition/input	Role and setting/context Contextual environment closest to real-life Two sensory inputs (visual on characters and pinyin recall typing) Teaching about creating conditions	Interactional authenticity spontaneous two-way flow, Equal Status	Interest and willingness to communicate (“Novelty”)
Procedure/actions	Procedure (content of the task, scaffolding step by step): enable learners to develop implicit, functional knowledge for communication	Negotiation strategy (prompt engineering for both designers and students)	Encouragement including: Compliment Encourage to Proceed
	Adaption (on proficiency level)	Learners were given instruction by <i>CFLingo</i> that is slightly more advanced than the current HSK 3 level or lower (i+/-1)	Analytical Ability: The skill to identify linguistic patterns and rules, and make an adaptation to AI or make further request

Feedback	Feedback	Feedback Strategy (mainly implicit some explicit)	Encouragement (linguistically) Politeness (pragmatics) Confirmation
	Follow up		Field independence (Individualized follow up, Learner autonomy) Challenging learners with i +1
Monitoring in the classroom	Monitoring through stored data	For Teacher and AI collaborative feedback	Processing anxiety (no interruption) Field independence

CFLingo's task design also accounts for affective variables influencing learners' perceived difficulty. It employs motivational strategies such as showing empathy, giving compliments, reducing processing anxiety, and switching tasks when learners feel bored, thus enhancing the learning experience. *CFLingo* leverages TCF to enhance adaptability through prompt engineering, focusing on "task conditions" and "task difficulty." As this is a design-based study, the refinement process is ongoing and informed by learner feedback. Each year, prompts are adjusted, and different ChatGPT models are tested for improvements.

4. Evaluation of the *CFLingo* Platform

4.1 Participants and Contexts

Throughout Fall 2023 and Fall 2024, the *CFLingo* platform was utilized in three third-year Chinese-as-a-Foreign-Language (CFL) classes, comprising a total of 27 students. Among the 27 students, 26 consented to participate in the study. The HSK Level 3 proficiency test was administered at the beginning of each semester to ensure that students shared a similar proficiency level. The results indicated that 90% of the participants scored 85 or higher in Reading and Writing, whereas 10% scored 65, which is also a passing score. By the third year of CFL study, students aim to achieve Intermediate-Mid to Intermediate-Advanced proficiency on the ACTFL scale, developing balanced listening, speaking, reading, and writing skills. The platform addresses the critical need for reading and writing practice with a language partner, acknowledging the unique linguistic characteristics of Chinese, where spoken and written forms are acquired separately. On this platform, interacting with GAI in real-life contexts helps bridge the gap by connecting the form, sound, and meaning of each character. During the refining and implementation process, "human-centered" is the key element being emphasized (Bhutoria, 2022; Yang et al., 2021).

4.2 Data Sources

Three types of data were collected to evaluate *CFLingo*'s effectiveness: students' responses to open-ended questions on their user feedback on *CFLingo*, interview feedback exploring their experiences and platform improvement, and conversational interaction data to understand the adaptivity of *CFLingo*.

4.2.1 TBLT Items and Open-Ended Questions

At the end of the semester, all students were asked to complete five open-ended questions to articulate their experiences engaging with *CFLingo*. These included questions such as: "How do you like the 'Student Follow-up Prompt Template' added to the language task, which you can refer to when you do not know how to ask questions or seek clarifications?" and "Have you experienced any noteworthy or challenging moments in your interactions with *CFLingo*?" The primary objective of these questions was to gain a comprehensive understanding of user experiences and to assess the overall self-reported effectiveness of *CFLingo* as a language learning tool.

4.2.2 Interview Protocols

Students were invited to participate in voluntary interviews at the end of the semester to discuss their experiences after using *CFLingo* in class. The interview protocol focused on their experiences and perceptions of the *CFLingo* platform, exploring various engagement and task effectiveness themes. Key questions included their general impressions of *CFLingo*, their typical interaction patterns, and the tasks they found most enjoyable or beneficial. For example, participants were asked to identify tasks they enjoyed, such as sentence generation or role-playing with it, and to suggest improvements for less effective tasks. The protocol also examined perceptions of *CFLingo* as a partner in language learning and solicited suggestions for enhancing the platform's instructional and technical design. The interview aimed to provide an in-depth understanding of students' perceptions, supplement the data obtained from the open-ended questions, and help offer insights into the potential of generative AI in supporting language acquisition.

4.2.3 Conversational Data

Participants' conversational data were collected as they engaged with *CFLingo* throughout the semesters. In total, participants generated 114 dialogue threads while interacting with *CFLingo* on various tasks, ranging from sentence generation to interviews with restaurant owners. Each dialogue thread consisted of conversations ranging from 2 to 18 exchanges as students and *CFLingo* communicated back and forth. All sentences were exported from *CFLingo* and grouped by students and tasks for data analysis. The conversational data was used to examine the adaptability of *CFLingo* in responding to students' prompts.

4.3 Data Analysis

Qualitative data from open-ended questions and interview transcripts were analyzed to address students' feedback on task sequencing and adaptivity. Additionally, student-*CFLingo* conversational data was collected and used to understand their experiences with the platform's adaptability.

An inductive coding process was applied for data from open-ended questions and interview transcripts. Researchers collaboratively analyzed the data to generate overarching themes and examined codes within each theme. It was double-coded if a data point aligned with the definitions of multiple themes or codes. Informed by constant comparative methods (Creswell & Creswell, 2017), researchers met regularly to discuss and finalize the codebook to ensure consistency. Subsequently, researchers reviewed each other's codes, refining them until 100% agreement was achieved (see Table 2).

Table 2 Codebook for Student's Open-ended and Interview Data

Theme	Codes	Definition	Example Quotes
Students' Feedback on Task Sequencing	Feedback on the progression of complexity of the tasks	Students' feedback on the design of <i>CFLingo</i> 's tasks gradually increases in complexity.	I did notice a difference, and it was still difficult towards the end, but it felt easier.
	Feedback on conceptual connections of the tasks	Students' feedback on the logical flow of <i>CFLingo</i> 's task design across all activities.	The debate task and essay feedback were interconnected, helping me see how arguments develop in different formats.
	Other comments or suggestions	Students' relevant comments or suggestions relevant to <i>CFLingo</i> 's task sequencing design	One thing I would suggest is for the 'Send Response' button to be made a little bigger
Students' Feedback on Adaptivity	Feedback on personalized conversational experiences	Students' feedback and perception of the personalized conversational experiences with <i>CFLingo</i>	I appreciated how it was like willing to work with me in that way, like a real person would.
	Feedback on vocabulary adaptivity	Students' feedback on <i>CFLingo</i> 's adaptivity on their vocabulary levels	The vocabulary would be beyond my level. I tried asking <i>CFLingo</i> to simplify its responses using prompts, and it

			helped me understand better.
	Feedback on difficulty adaptivity	Students' feedback on <i>CFLingo</i> 's adaptivity on their conversation's difficulty level	I think sometimes it's a little bit too challenging. I don't think it's ever too simple. But if I ask it to write a little simpler, it's usually pretty good about making it more understandable.
	Other comments or suggestions	Students' relevant comments or suggestions relevant to <i>CFLingo</i> 's task adaptivity design	It sometimes oversimplifies when switching to easier vocabulary, and I understand that's a tricky balance to strike

For conversational data, a deductive coding process was used, guided by CH (Peter, 2001), which informed the coding framework. Initially, the same dataset was collaboratively coded to develop a shared codebook. A selective coding approach was used to identify a central theme, such as 'Interactive Factors,' which included codes or sub-codes like 'Implicit Hints.' Each theme or code represented a unique idea, with double coding applied when data aligned with multiple codes or sub-codes. After consolidating their individual codebooks into a single, unified version, this version was used to code the remaining interview transcripts. The researchers then reviewed each other's codes until they achieved 100% inter-rater reliability. Table 3 below presents the coding structure for the conversational data. Since *CFLingo* responds to participants in Chinese, corresponding English translations are provided in the "Quotes" column. In addition, percentages were provided for each theme and code. For example, the label 61% next to 'Interactive Factors' indicates that 61% of the data was coded under the theme of Interactive Factors. In comparison, 43% of the remaining data was coded under Affective Variables. Percentages for codes were calculated relative to their corresponding theme. For instance, 31% next to 'Proficiency' indicates that, within the theme of Interactive Factors, 31% of the codes pertained to Proficiency level. Similarly, within the Proficiency level code, 42% were coded as 'Plus one' and 58% as 'Minus one'.

Table 3 Codebook for Student-CFLingo Conversational Data

Theme	Codes	Sub-codes	Definition	Example Quotes
Interactive Factors (61%)	Proficiency level (31%)	Plus One (42%)	Learners were given instruction by <i>CFLingo</i> that is slightly more advanced than the current HSK 3 level.	很好！你能不能用一个更长一点儿的句子。 Great! Could you use a slightly longer sentence?
		Minus one (58%)	Learners were given instruction by <i>CFLingo</i> that is slightly less advanced than the current HSK 3 level.	"考虑"的意思是 "to consider"。你来试试回答问题。 The meaning of "考虑" is "to consider." Why don't you give it a try and answer the question?
	Negotiation strategy (10%)		The interaction between <i>CFLingo</i> and learner reaches a mutual understanding during communication.	我会用简单的词汇重新问问题。 I will ask the question again using simpler vocabulary.
	Feedback Strategy (52%)	Implicit (Demo) (18%)	<i>CFLingo</i> gives examples and lets learners correct errors on their own.	为了使句子更完整、更清楚，可以这样改写。 To make the sentence more complete and clearer, it can be rewritten like this
		Implicit (Recast) (4%)	<i>CFLingo</i> reformulates part or all of a learner's utterance by replacing non-target language items with the correct form.	对的！白明下了飞机打算坐出租车到学校。 That's correct! After getting off the plane, Bai Ming plans to take a taxi to school.
		implicit (Hint) (53%)	<i>CFLingo</i> allows learners to try again by giving them linguistic hints.	你的句子结构很好！这里有一个小的改进建议。 Your sentence structure is excellent! Here's a small suggestion for improvement.
		Explicit (25%)	<i>CFLingo</i> clearly states or corrects the errors.	我们可以把两个从句用表示原因的连接词连接起来，使句子更流畅。

				We can connect the two clauses using a conjunction that indicates reason, making the sentence flow more smoothly.
	Equal Status (6%)		The interaction between <i>CFLingo</i> and learner shows equal roles.	没问题，我来帮助你理解。 No problem, I'm here to help you understand.
Affective Variable (39%)	Encouragement (63%) both linguistically also procedural	Compliment (30%)	<i>CFLingo</i> compliments learners based on their progress.	太好了！你造的这个句子很清楚，也很流畅。继续保持！ That's great! The sentence you created is very clear and flows well. Keep it up!
		Encourage to Proceed (70%)	<i>CFLingo</i> encourages or motivates learners to progress through the tasks.	希望这样解释更清楚，你可以尝试调整一下自己的句子。 I hope this explanation makes it clearer. You can try adjusting your sentence.
	Confirmation (16%)		<i>CFLingo</i> provides constructive feedback starting with what they did well at, aimed at reducing processing anxiety.	你的句子很清楚，也表达了意思。 Your sentence is clear and conveys the meaning well.
	Politeness (pragmatics) (21%)	Response to request (23%)	<i>CFLingo</i> is responsive and respects the learner's request.	当然可以。 Of course.
		Empathy (38%)	<i>CFLingo</i> shows empathy to learners' frustration like friends. Aimed to reduce stress and anxiety.	不要灰心！请试着这样安排... 再试一次。 Don't get discouraged! Please try to arrange it this way... Give it another shot.

		Make Request (23%)	<i>CFLingo</i> politely makes requests to learners after providing hints.	你可以尝试一下这个句型吗? Can you try using this sentence pattern?
		Apologize (15%)	<i>CFLingo</i> expresses apologies to learners during conversation.	对不起, 我解释地不够清楚。 I'm sorry; I didn't explain it clearly enough.

4.4 Evaluation Results

4.4.1 Students' Feedback on Task Sequencing Design of *CFLingo*

Students noted that the sequence of tasks is thoughtfully designed to gradually increase in complexity. Many participants appreciated how initial tasks focus on foundational skills, such as sentence generation, allowing them to build confidence before tackling more challenging activities. One student remarked, "Starting with simple tasks and moving to more complex ones really help me feel prepared... I can see my progress". The design of the task sequence also reinforces learning by revisiting previously covered material in new contexts. Students expressed that this repetition aids retention and understanding. One student stated, "I love how we come back to earlier topics in different tasks... it really helps solidify what I've learned". The results showed that a gradual increase in cognitive demands (Robinson, 2003b) supports learners in developing their skills systematically.

Moreover, students also highlighted the logical flow of tasks as a significant strength of the *CFLingo* platform. Many participants appreciated how each task builds on the previous one, creating a coherent learning experience. One student noted, "the way tasks are connected makes it easy to follow along... I always know what to expect next". This coherence helps students navigate their learning progression more effectively as they achieve higher-level language skills. An instructional implication is that when designing sequential tasks, in addition to increasing complexity, establishing clear connections between consecutive tasks can provide students with a smooth transition to new content by allowing them to easily integrate new material with their existing knowledge schema (Van Kesteren et al., 2014).

Additionally, students appreciated the variety of task types within the sequence, which kept the learning experience engaging. Many participants noted that alternating between different types of activities prevents monotony and maintains interest. One student remarked, "I enjoy how we switch between debates, role-plays, and writing tasks... it keeps things fresh". This variety contributes to sustained engagement and enthusiasm for learning.

In summary, students provided positive feedback on the sequential design of tasks embedded in *CFLingo*, which justified that the Cognitive Hypothesis can be applied in designing GAI-integrated language learning platforms and can yield positive learning experiences.

4.4.2 The Evaluation of the Adaptability Design of *CFLingo* via Students' Conversations and Feedback

4.4.2.1 The Evaluation of Adaptability via Conversation

Based on the analysis of students' conversations with the language AI platform *CFLingo*, several key themes emerged, highlighting the adaptability provided by *CFLingo*. These themes reveal how interactive and affective factors influenced learners' engagement and progress.

Interactive Factors

Interactive Factors were one of the significant themes, making up 61% of the coded conversations. Within this category, the sub-code Feedback Strategies was particularly prominent (see Figure 10), which comprised implicit and explicit forms of feedback. Notably, implicit feedback, particularly through Hints, had a significant impact, with 53% of instances recorded. For example, *CFLingo* remarked, "你已经很接近了! 不过这里的结构需要调整一下。" ("You're very close! However, the structure here needs some adjustments."). This strategy not only encourages learners but also invites them to engage in self-correction, promoting autonomy and critical thinking. In contrast, explicit feedback, as in the statement "好的, 让我们更细化地解释一下。" ("Sure! Let's break it down more clearly"), although less frequent (25%), serves to clarify specific errors and reinforce learning outcomes. This combination of feedback types illustrates that *CFLingo* can flexibly adjust its responses based on learners' real-time learning needs. This indicates the effectiveness of the engineering techniques applied in its design, highlighting the importance of both guided exploration and clear, direct instruction in language learning.

Further enhancing the interactive experience was the proficiency levels. The Input Hypothesis (Krashen, 1985) suggested "i+1" strategy for Comprehensive Input, which states that language learners acquire language when they understand messages that are slightly above their current level of competence, was evident in prompts like, "请再试一次, 用更复杂的句子。" ("Please try again, using a more complex sentence"). This approach encourages students to stretch their language abilities, promoting growth and understanding. Conversely, the "Minus One" strategy allowed students to encounter language input that was slightly below the designed HSK3 level, as seen in the interaction, "顺畅"意思是"流利"、"没有阻碍的", 英文是 "smooth" 或 "fluent" ("The meaning of '顺畅' is 'fluent' or 'unobstructed'; in English, it is 'smooth' or 'fluent'). This method provides necessary scaffolding, enabling learners to build confidence while grappling with new concepts. The balance between these strategies suggests that *CFLingo* was able to provide differentiated input, which is vital for accommodating diverse learner proficiency levels.

The findings suggest several implications for instructional design. First, integrating Plus One and Minus One strategies into language learning environments can create a more

adaptable experience for students. Educators can prompt GAI tools to adjust to varying proficiency levels, allowing learners to engage with content that is both challenging and accessible. This flexibility ensures that learners can progress at their own pace while still feeling challenged. Additionally, the diverse feedback strategies observed underscore the need for training GAI in providing effective feedback. The frequent use of implicit feedback, such as hints and encouragement, alongside explicit corrections, can foster a dynamic learning atmosphere. As evidenced by the *CFLingo*'s use of feedback, "你的句子更好了！但可以更简单些。试试这样" ("Your sentence is better! But it can be simpler. Try this."), designers should aim to balance supportive guidance with explicit instruction. Designers can input more pre-designed example sentences into the prompt to guide GAI in cultivating an environment that encourages student autonomy and risk-taking in language use.

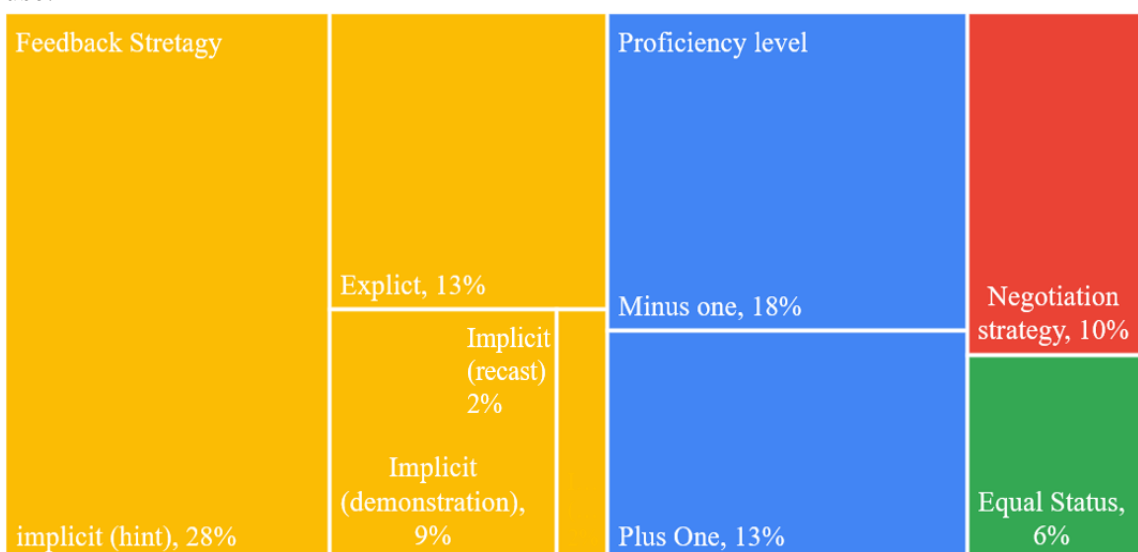


Figure 10 The Proportion of Categories under Interactive Factors

Affective Variables

The analysis also highlighted Affective Variables (see Figure 11), with Encouragement emerging as a vital factor, comprising 63% of interactions. Positive reinforcement, such as in the quote, "非常好！说得很完整！" ("Very good! You expressed it very thoroughly!"), illustrates how acknowledgment of effort can significantly enhance motivation and persistence among learners. Encouraging students to proceed, as seen in the *CFLingo*'s prompt, "接近了！但主述宾的结构不完全正确，可以稍微调整一下，请再试一次" ("You're getting close! However, the subject-verb-object structure is not entirely correct; it can be adjusted slightly. Please try again"), fosters a sense of support and empowerment. Empathy was another critical component, as the AI displayed understanding of students' frustrations, responding with phrases like, "没关系，我们一起来看看一下" ("No worries, let's take a look together."). Such empathetic engagement not only reduces anxiety but also promotes a more inviting learning environment. Educators and

designers can consider integrating empathetic responses into their instructional methods to ensure students feel valued and supported throughout the learning process.

These findings suggest that designers and instructors should prioritize the integration of affective variables in educational tools and environments. Designers of AI platforms like *CFLingo* can enhance learner engagement by incorporating features that provide regular positive feedback and encouragement, similar to the examples observed in the study. Additionally, providing options for empathetic responses can help address learners' emotional needs, creating a more supportive atmosphere. By fostering a supportive and positive environment, student engagement could be enhanced, making language learning a more enjoyable and effective experience. The following sections synthesize the specific features that enabled *CFLingo* to deliver adaptive feedback to learners.

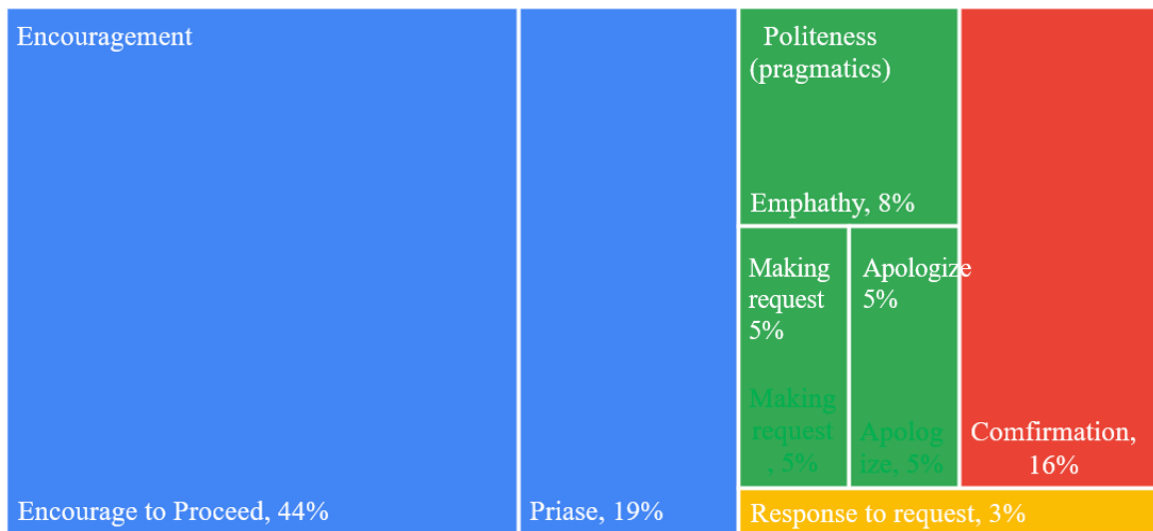


Figure 11 The Proportion of Categories under Affective Variables

4.4.2.2 Students Feedback on Adaptability

A prominent theme in adaptability was *CFLingo*'s ability to personalize learning experiences according to individual students' learning paths. Participants acknowledged that *CFLingo* offered alternative ways to articulate their thoughts while encouraging critical engagement with the content. This interaction prompted students to reflect on their writing processes and explore avenues for improvement in their language skills. The friendly and supportive tone of the feedback contributed to a positive learning atmosphere, fostering a greater sense of comfort throughout their educational journeys. In addition to immediate feedback, students valued the constructive criticism offered by *CFLingo*. Many participants mentioned that the platform not only points out errors but also provides suggestions for improvement. One student shared, "When I make a mistake, *CFLingo* doesn't just tell me I'm wrong; it shows me how to fix it, which is really helpful".

In addition, students expressed that *CFLingo* effectively adapts to their vocabulary learning needs. Many noted that the platform provides personalized vocabulary exercises

that align with their vocabulary levels. For instance, as students indicated, when they respond to *CFLingo* in Chinese, “it will evaluate the proficiency of my vocabulary”. This adaptability allows students to engage with vocabulary that is relevant and challenging for them. Another significant theme was *CFLingo*'s ability to assist with sentence comprehension. Students appreciated the platform's feedback on their sentence structures and grammar. One participant stated, “It knows what it's talking about, and it does give good feedback... I see it as a partner”. This indicates that students view *CFLingo* as a supportive companion that enhances their understanding of complex sentence structures based on their needs.

More importantly, the adaptability of task difficulty appeared to be a recurring theme in student feedback. Many students appreciated that *CFLingo* adjusts the complexity of tasks based on their performance, allowing for a personalized learning experience. One participant remarked, “I like that the tasks get harder as I improve... it keeps me challenged without being overwhelmed”. This adaptive approach ensures that learners are consistently engaged and motivated to progress in their language skills. Another aspect of *CFLingo*'s adaptability is its ability to create tailored learning paths for students. Many participants noted that the platform adjusts the difficulty of tasks based on their performance, allowing for a more customized learning experience. One student shared, “*CFLingo* can assess my progress and then suggest new topics or vocabulary that I should focus on next”. This feature not only helps students stay engaged but also ensures that they are consistently challenged at an appropriate level, facilitating steady progress in their language skills.

In summary, findings from student responses and interviews revealed that *CFLingo*'s adaptability was perceived as a key factor in enhancing their learning experiences, mainly by providing personalized learning paths. These results support the applicability of the Triadic Componential Framework (TCF) in designing adaptability for GAI-integrated language learning platforms, demonstrating its potential to yield positive learning outcomes. As Robinson (2007a) observed, learners may achieve better performance in specific learning contexts, such as a Task-Based Language Teaching (TBLT) approach, when these contexts align with their cognitive strengths. This suggests that *CFLingo* effectively leverages TCF to create an adaptive, human-centered, problem-solving environment, fostering improved L2 production and overall language performance.

5. Discussion and Implications

As shown in Table 1, *CFLingo*'s task design introduces several innovative attributes compared to traditional TBLT task design features (Candlin, 1987). Notably, *CFLingo* leverages adaptability, implicit feedback, and enhanced interactional demands to create an immersive, human-centered learning environment. Furthermore, the platform promotes teacher-AI collaboration, seamlessly integrating technology with pedagogical goals to enhance student proficiency and fluency in L2 learning. These aspects will be discussed in the following sections.

5.1 Individualized Adaptability With a Focus on Proficiency Level

In pre-designed prompts for each pedagogic task, researchers incorporate a step called “Adaptation.” Initially, *CFLingo* was given an HSK 1-3 vocabulary list and instructed to tailor its language use accordingly. Adhering to the “i+1” principle of the Input Hypothesis (Krashen, 1985), researchers prompt the *CFLingo* to present learners with language input slightly above their current level. During the “feedback or follow-up” sections, *CFLingo* is programmed to adjust its proficiency level in response to students’ signs of frustration or requests for modifications, utilizing simpler grammatical structures or rephrasing input based on the chapter’s vocabulary bank. This allows the *CFLingo*’s proficiency to dip below HSK 3, which is referred to as “i-1.” This adaptability is not limited to the “Adaptation” step; it is also evident in the “task setting” and “task follow-up” phases, where *CFLingo* provides individualized support and ensures continuity.

The data indicates that adaptability is highly rated across interactive task conditions. This feature includes dynamically adjusting proficiency levels during personalized dialogues, providing varied and constructive feedback, and facilitating negotiation. On the affective side, *CFLingo* offers both procedural and linguistic encouragement, emphasizes pragmatic language use, and motivates learners to engage with the material, revise their work, and enhance their L2 production.

5.2 Implicit Feedback: Elevating Task Performance

Constructive feedback on *CFLingo* includes both implicit and explicit forms, with data revealing (see Figure 8) that the majority of feedback provided is implicit. This feedback typically consists of examples (with measures in place to prevent learners from copying and pasting, ensuring genuine learning), hints that explain grammatical errors in Chinese without directly supplying the correct answer, recasts, and encouragement for students to try again. Research indicates that implicit feedback is particularly beneficial for learners, as highlighted by Ellis (1994). This type of feedback promotes deeper cognitive processing and helps learners cultivate an intuitive understanding of the language.

5.3 Interactional Demands Enhanced Throughout the Design

In TCF, task conditions significantly influence task performance. Within the *CFLinguo* platform, cognitive demands are carefully graded and sequenced. However, the interactional demands of pedagogic tasks are not explicitly graded and sequenced (Robinson, 2006). Instead, these demands are enhanced throughout *CFLingo* design. Most of the tasks—such as sentence generation, role play, and debates—are open-ended discussions that promote a two-way flow of communication and divergent solutions.

Robinson (2006, p. 22) emphasizes that “holding task conditions constant is important to ensuring transfer of training to real-world contexts. The more task conditions are practiced in pedagogic versions, the more elaborate and consolidated the scripts become for real-world performance, which successful transfer will draw upon outside the classroom.” Tasks that allow open solutions encourage creativity and critical thinking, while a two-way flow of communication fosters interaction between learners and the AI or

among peers, leading to richer dialogues. Additionally, tasks that promote divergent solutions support learners in developing various strategies for language use and problem-solving. *CFLingo* provides an improved context and environment for task performance, leading to enhanced outcomes in L2 production.

5.4 Immersive Authentic Chinese Environment Promotes Fluency

In the *CFLingo* platform, both AI and learners are required to communicate in the target language, enhancing both situational and interactional authenticity (ELT Concourse, n.d.). This approach also promotes learners' aptitude profiles by encouraging practical solutions and strategic language use during interactions. Often, it can be challenging for learners to engage in conversations within a target language environment during traditional pair work due to varying levels of ability or affective factors.

It is exciting to witness this seamless language flow occurring in *CFLingo* interactions, where the AI consistently provides examples and hints in the target language first, creating an experience similar to communicating with a native Chinese speaker. A thorough analysis of accuracy and complexity necessitates additional data; however, a significant improvement in writing fluency has been observed, as measured by words typed per minute and character recognition. Additional empirical data will be analyzed in the next stage of the research.

5.5 Teacher-AI Collaboration in Providing Instructional Feedback

The designer or instructor is not only able to monitor learners' progress and learning behaviors—such as whether they have completed all the questions, if they are using the target language, and whether they are applying any prompt engineering strategies—but the stored data also provides a valuable opportunity for teachers to offer follow-up feedback. As shown in Figure 12, this capability enables teachers to provide collaborative feedback during the after-task session, assisting students in revising and refining their final target tasks, such as creating descriptive or argumentative essays.

This design feature aligns with Yan's (2024) strong call for a “human-centered perspective towards the application of AI in education,” which should be encouraged and upheld in research regarding the impact of AI on education (Yan, 2024, p. 14). The design and instructional implication is that when leveraging prompt engineering through the OpenAI API to develop a platform, designers must ensure that it is structured for a CFL classroom that prioritizes a human-centered and user-friendly approach, which will significantly influence the learning experience and outcomes.

Sample Exercise Interface of CFLingo 智语学伴—Essay Critique 作文点评

Narrative Essays:outline (记叙文)

Argumentative Essays:draft (议论文)

CFLingo点评: 这个大纲很不错, 有开头、结尾和中间部分。你的主题和观点都很鲜明 (clearly)。然而, 一些部分可以更具体。比如: 1. 开头可以详细描述 (detailed explanation) 你亲人对你的生活的重要性。可以加一句, 例如: “他们在我生活中有非常重要的地位 (position)。” 2. 中间部分, 每个段落都可以增加一些细节。例如: - 家庭: 可以举例说说与每位亲人的具体回忆。例如: “和姥姥姥爷一起过年的时候, 他们总是做很可口的饭菜。” - 女朋友和朋友: 可以加入你们的一个特别的活动或者趣事: “第一次见面是在图书馆, 她帮我找到我要的书。” - 宠物: 可以描述你们平时一起做的事情, 例如: “我常常和猫一起在家看电视, 她总是喜欢钻到我的怀里。” 3. 结尾: 可以再总结一下亲人与自我成长的关系 (relationship with personal growth), 例如: “通过与他们相处, 我学会了…… (比如感恩 (gratitude))。” 请再试着修改一下这个大纲, 然后再分享一遍可以更丰富 (enrich) 你的描述。

单老师点评:

同意AI给出的大部分建议, 比如中间部分增加细节, 结尾的主题升华。请注意标题和主题的一致性, 比如是我爱的人, 还是我的家人? 结构上值得注意的是: 开头部分引出话题, 中间部分你要介绍四类爱的人, 要注意详略得当, 重点突出, 故事之间的衔接。注意个别字词使用。推荐词汇: 不是亲人, 胜似亲人。期待你的第一稿。

CFLingo 第一稿点评:

你的稿件给出了一个很好的开头、中间和结尾的结构, 围绕着一个明确的论点进行展开。以下是一些建议: 1. “论点的准确性”: 你明确指出了自己的观点, 即父母不应过分介入子女的感情生活, “门当户对”对于婚姻和爱情很重要, 同时拥有相似但不完全一样的爱好对维持关系有好处。这三个观点清晰、论点鲜明。2. “整体结构”: 文章的整体结构 (总-分-总) 设计得相对合理, 但在过渡句子上可以做得更好一些。尤其是从一个主要论点转移到下一个论点时, 可以使用一些过渡性的表达, 如“接下来, 我们来谈谈……”。3. “关联词使用”: 建议使用更多的关联词来增强文章的连贯性。例如, 在介绍新论点时可以使用“首先, 其次, 最后”等。4. “论据是否充分”: 你提供了一些生动的例子来支持自己的观点, 这是非常好的。但对于每个观点, 如果能提供更多具体的例子或数据支持, 会使论证更加有力。5. “论证是否合理”: 你提出的论证大体上是合理的, 但在“门当户对”这部分, 可能需要更详细地解释为什么相似的经济和文化背景能使关系更稳定。6. “用词选择”: 用词基本恰当, 但注意, 为了使文章更加书面化, 应尽量避免使用口语表达, 如“老公”可以换为“丈夫”, “共同朋友合不来”可以修改为“与共同朋友相处不融洽”。7. “语法结构”: 整体语法结构使用较为恰当, 但需要注意时态的一致性和主谓一致。8. “语体”: 文章的语体整体偏向书面语, 这对于论文来说是合适的。但还可以进一步规范, 尽量使用准确、正式的词汇。总的来说, 你已经完成了一篇内容丰富、结构清晰的作文。在修改时, 注意以上提到的细节, 并尝试加入更多支持你观点的证据, 使论证更加充分, 期待你的改进稿。

单老师点评: 文章可以很自然地提出问题 bring up an issue, 你试图引出论点, AI的点评部分我并不是完全同意 (看红色强调部分), 你的论点可以分为两部分, 而不是“三个观点”, 但是你的确可以更加明确地阐述。分析问题 analyze 部分层次合理, 关联词使用得体。我同意AI建议, 可以增加一些具体的例子或者参考数据 (citations), 比如为什么“门当户对”更好? 解决问题 solve 总结完整, 很好地总结了你论点的两部分。其次, 针对议论文用语, 如AI建议的, 可以增加书面语的使用。整体来说, 这一稿已经是一个很好的开端, 期待你进一步改进!

Figure 12 Teacher-AI collaborative feedback through Stored Data on CFLingo

6. Future Direction

The current *CFLingo* platform, guided by the Cognitive Hypothesis and Triadic Componential Framework, has paved several avenues for future research and development. First, as students interact with *CFLingo*, substantial conversational data are generated, providing researchers with valuable insights into students' conversational experiences. The next step for researchers is to associate these experiences with student characteristics, such as their perspectives, and to further evaluate how syllabus and task designs influence learners' writing fluency, accuracy, and complexity. Specifically, analyzing how students respond to *CFLingo*'s tasks and instructions—using methods such as sentiment analysis or discourse analysis—can offer significant insights into their interactions with GAI tools in language learning.

Secondly, with advancements in large language models, the researchers aim to incorporate voice input features into *CFLingo*. While the current version enables students to practice vocabulary and writing skills, speaking is fundamental to language acquisition. Integrating a voice input feature would enhance *CFLingo*'s capacity to support comprehensive language proficiency.

Finally, researchers propose creating an immersive learning environment in the target language that aligns with structured Second Language Acquisition frameworks. Moving forward, the environment will be refined by incorporating interactive elements and considering learner-specific factors. The impact on learner performance will be evaluated using empirical data collected through *CFLingo*, providing insights into the effectiveness of immersive learning designs for language acquisition outcomes.

7. Conclusion

This research introduces a pioneering platform that integrates GAI tools within task-based language teaching (TBLT) syllabus design—the *CFLingo* platform. By applying the TBLT framework's cognitive hypothesis and the Triadic Componential Framework, the design demonstrates how GAI can optimize task adaptability for individual learners, thereby enhancing the task condition: interactional factors. While the qualitative empirical data gathered showcases the adaptability of generative AI, it is important to note that the sample size is relatively small. Nonetheless, the feedback collected indicates that students have a positive perception of *CFLingo*, highlighting the benefits they experience from the progressive complexity of task sequences, and the adaptive feedback provided by the platform. As students engaged with various tasks in *CFLingo*, they acknowledged the impact of affective factors on task design, noting how these elements contributed to their Chinese learning experience, particularly the perceived difficulty level. Overall, this study suggests a promising future for GAI-integrated TBLT in further enhancing learners' accuracy, fluency, and complexity in second language acquisition.

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Appendix 1

The Triadic Componential Framework for Task Classification – Categories, Criteria, Analytic Procedures, and Design Characteristics

Task complexity (cognitive factors) (Classification criteria: cognitive demands) (Classification procedure: information-theoretic analyses)	Task condition (interactive factors) (Classification criteria: interactional demands) (Classification procedure: behavior-descriptive analyses)	Task difficulty (learner factors) (Classification criteria: ability requirements) (Classification procedure: ability assessment analyses)
(a) Resource-directing variables making cognitive/conceptual demands ± Here and now ± Few elements ± Spatial reasoning ± Causal reasoning ± Intentional reasoning ± Perspective-taking	(a) Participation variables making interactional demands ± Open solution ± One-way flow ± Convergent solution ± Few participants ± Few contributions needed ± Negotiation not needed	(a) Ability variables and task-relevant resource differentials h/l Working memory h/l Reasoning h/l Task-switching h/l Aptitude h/l Field independence h/l Mind/intention-reading
(b) Resource-dispersing variables making performative/procedural demands ± Planning time ± Single task ± Task structure ± Few steps ± Independency of steps ± Prior knowledge	(b) Participant variables making interactant demands ± Same proficiency ± Same gender ± Familiar ± Shared content knowledge ± Equal status and role ± Shared cultural knowledge	(b) affective variables and task-relevant state-trait differentials h/l Openness to experience h/l Control of emotion h/l Task motivation h/l Processing anxiety h/l Willingness to communicate h/l Self-efficacy

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基于文心大模型的 AI 中文语伴开发模式对比研究 (A Comparative Study on Development Models of AI Chinese Language Partners Based on the ERNIE Large Language Model)

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摘要: 语伴在语言学习中的重要性不言而喻, 在生成式人工智能技术飞速发展的时代背景下, 本研究尝试依托大语言模型构建 AI 中文语伴, 选用百度文心一言大模型 (ERNIE) 作为基础大模型, 通过编写提示词 (Prompt)、集成本地中文教学资源等方式使通用大模型更适用于国际中文教育领域。本研究分别用低码态与代码态两种开发模式开发面向中文学习者的 AI 中文语伴, 并对两种开发模式的开发过程进行对比, 然后从基本功能、生成内容等方面对开发的 AI 中文语伴进行分析并给出择用建议。

Abstract: The importance of language partners in language learning is undeniable. In the context of the rapid development of generative artificial intelligence technology, this study attempts to construct an AI Chinese language partner based on large language models, utilizing the ERNIE model as the foundational model. By crafting prompts and integrating local Chinese teaching resources, the general model is tailored to better suit the field of international Chinese education. This research develops AI Chinese language partners for Chinese learners using both low-code and code-based development modes, comparing the development processes of these two approaches. Furthermore, the study analyzes the developed AI language partners in terms of basic functionalities and generated content, providing recommendations for their selection and use.

关键词: 大语言模型、AI 中文语伴、低码态、代码态、国际中文教育

Keywords: LLM, AI language partner, low-code, code-based, Chinese language education

1. 引言

语言伙伴 (Language Partner), 即语伴, 通常指与语言学习者一起学习语言的伙伴 (陈倩, 2020), 他们不仅可以是语言学习者, 也可以是练习语言的对象, 其作用主要体现在帮助二语学习者巩固语言知识、锻炼二语思维、提高交际能力 (周欣宜, 2024)。在国际中文教育领域, 一方面, 由于时间、空间、交流意愿、语言水平等多种因素, 在非洲、美洲等“非中文社区”, 中文语伴资源明显短缺, 为中文学习者匹配到合适的真人语伴并不容易; 另一方面, 专业语伴系统的开发较为复杂, 较难实现个性化, 且中文学习者直接使用传统的问答系统和通用生成式人工智能 (如 ChatGPT、文心一言 (ERNIE)) 并无法满足与真人语伴对话类似的效果, 效果不佳 (郑永红等, 2024), 其原因在于传统问答系统存在自然语言理解能力差、数据质量无法保证、维护成本高等问题 (闫悦等, 2023)。同时, 直接使用通用生成式人工智能则无法对生成内容的适需性、准确性进行有效控制, 无法满足专业领域的教育需求 (张春红等, 2023)。

基于大语言模型和智能体平台构建的智能体 (Agent), 有望能够担任语伴的角色, 为中文学习者创造“无人”环境下的中文交流机会, 填补“真人语伴”的空缺; 同时还可以借助大语言模型出色的自然语言理解和生成能力, 为中文学习者提供更适需、准确的语言学习服务。在国际中文教育领域, 曹钢 (2023) 和马瑞凌 (2024) 等人已在之前提出尝试采用“低码态” (Low-code) 或“代码态” (Code-based) 两种人机共创的开发模式建设各式新型的数字应用的想法, Trigo (2022) 等人于其他领域对两种模式下开发的应用进行了探索。据此, 本研究将实验中基于生成式人工智能构建中文语伴的开发模式划分为低码态和代码态两种, 并对两种开发模式下的 AI 中文语伴进行分析比较, 探讨以下两个问题:

- (1) 不同开发模式下 AI 中文语伴的具体构建过程为何?
- (2) 不同开发模式构建的 AI 中文语伴生成效果如何?

2. 相关概念界说及研究思路

2.1 低码态与代码态的界说

基于大语言模型的中文 AI 语伴开发可分为两种优势不同的模式: 低码态开发 (Low-code Development) 和代码态开发 (Code-based Development), 这两种开发模式适用于不同开发情况和需求。

第一, 低码态是一组数字技术工具平台, 基于图形化拖拽、参数化配置等更为高效的方式, 实现快速构建、数据编排、连接生态等 (Rokis & Kirikova, 2022), 旨在通过不用代码或少量代码 (如在组件中编写代码处理输入变量来生成返回值) 实现不同场景的构建, 通过图形工具简化了开发过程。低码态允许开发者对代码只

有基础了解甚至不需要了解, 开发者只需要根据任务需求使用平台提供的组件实现数字化转型中的场景应用创新。

第二, 与之相对应的则是代码态, 即传统的以编写程序来实现软件功能的开发模式, 例如通过代码对模型进行微调、界面设计、端口连接等, 具有高度的编码灵活性, 适用于各行业领域, 功能实现较灵活自由, 代码态开发要求开发者具备与代码相关的专业知识与丰富的编程背景, 通常由专业的技术人员来完成开发任务, 工作量较大、开发周期较长、成本较高。

综上, 从开发要求来看, 低码态开发模式允许代码能力不强甚至没有代码能力的中文教师能够通过设计提示词 (Prompt)、增加外部知识库等操作为中文学习者构建适需的 AI 中文语伴。代码态开发模式则允许通过编程对 AI 中文语伴进行更精细化、更具针对性的定制, 例如: 交流界面设计, 生成随机性、文本多样性等参数设置等。

2.2 智能体及其参数界说

智能体是指一种人工智能代理, 具备环境感知能力, 能够自主理解、决策和执行任务 (Wooldridge & Jennings, 1994)。它根据任务目标独立进行规划, 将复杂任务分解为多个步骤, 从而完成目标。

在构建 AI 中文语伴的过程中, 智能体的参数设定十分重要, 生成式人工智能的反馈会根据参数设定的不同而变化 (Mizumoto & Eguchi, 2023)。低码态和代码态下的参数配置各具特点, 为不同需求的用户需求提供了灵活的选项。在低码态的默认设定中, 参数简化并优化为直观的操作, 例如多样性调节 (Temperature) 和采样范围调节 (Sampling Diversity), 其中多样性参数控制生成文本的丰富性, 取值越大, 输出越具创意且多样; 采样范围则调节模型的随机性, 较高的数值带来更多变的回答, 而较低的数值则让输出趋于一致。

在代码态中, 参数配置更为精细, 为二语学习者提供了更广泛的个性化设置空间。例如设置惩罚 (Penalty) 用于减少生成内容中重复 token 的现象, 值越高, 重复的生成内容会被更强烈地抑制; 设置流式输出 (Streaming Output) 控制生成内容的输出速度, 让用户可以边生成边查看, 提升响应体验; 设定人设 (Persona) 让模型根据设定的个性或身份特征输出符合特定“人设”的内容, 以实现更个性化的互动。

2.3 网络爬虫技术界说

网络爬虫技术 (Web Scraping) 是一种用于自动化数据收集的技术手段 (盛景等, 2024), 广泛应用于获取互联网上的大规模信息。通过模拟用户浏览行为, 爬虫程序发送请求至服务器, 接收并解析返回的网页数据, 以提取特定内容。近年来, 爬虫技术开始帮助国际中文教育领域的研究者和教育工作者获取多源数据, 为中文学习资源库的建设、教学内容的更新以及学习者行为分析提供数据支持。

2.4 研究思路

第一, 本研究将基于研究目标设计 AI 中文语伴需具备的功能, 如社交功能、教学功能、辅助功能等, 根据应用功能对大模型进行选择并整理相关中文专业知识, 为后续应用开发做好准备。

第二, 运用两种开发模式进行具体的 AI 中文语伴开发实践, 其中低码态模式主要依据平台提供的选项, 借助功能描述、提示词设计、角色设定等方法, 完成 AI 中文语伴功能的实现; 代码态模式下, 本研究主要借助百度提供的文心大模型接口, 辅以代码完成 AI 中文语伴功能的开发, 低码态开发与代码态开发的流程如图 1 所示。

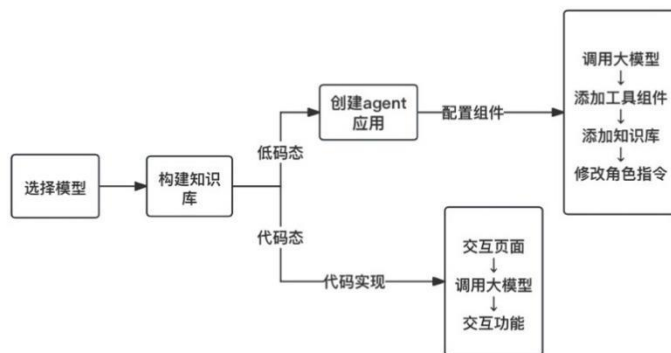


图 1 低码态与代码态的开发流程

第三, 在使用两种开发模式分别搭建完成 AI 中文语伴后, 将两种模式的开发流程及其生成内容进行对比, 并邀请一线国际中文教师和中文学习者分别评价两种 AI 中文语伴的生成效果, 最后给出对于两种开发模式的择用建议。

3. 低码态与高码态模式下的 AI 中文语伴构建流程

3.1 开发准备

3.1.1 模型选择

目前, 国外已经开发了多种专门用于教育领域的人工智能大模型, 如 Khanmigo^①、Merlyn Mind^②和 ChatGPT Edu^③等, 能够解决一些教育场景下的任务需求。国内, 王鑫雷等人 (2020) 对比了目前不同预训练语言模型, 发现百度的 ERNIE (Wang & Fen, 2022) 相较于其他模型在中文问答任务中效果最佳。在中文处理方面, 国内大模型显然比国外的大模型更具有优势, 文心大模型 4.0 能够更好地理解中文语境和

^① Khanmigo 信息参见: <https://www.khanmigo.ai/>

^② Merlyn Mind 信息参见: <https://www.merlyn.org/>

^③ ChatGPT Edu 信息参见: <https://openai.com/index/introducing-chatgpt-edu/>

语义, 在中文处理方面具有较高的准确性, 故本研究选择基于文心大模型搭建 AI 中文语伴。

3.1.2 领域知识库构建

文心大模型为通用型大模型, 能适应多种场景, 但是在特定领域生成的内容存在准确性不高, 专业性不足的问题, 因此需要引入适配微调帮助模型更好地适应特定需求(代必芳&陈贵平, 2024)。由于面向教育类应用, 为增强产品的教育性与科学性, 本研究收集了《新汉语水平考试大纲》、《HSK 标准教程》、HSK 一至六级考试真题与答案解析等资料, 并采用爬虫技术获取了网络上公开发布的国际中文教育文本数据(如国际中文教材、习题、教案等), 实现了领域知识库的构建, 作为领域知识上传至大模型中, 实现国际中文教育领域知识增强, 使模型生成的答案更加科学、精准。

3.2 系统功能设计

本研究拟搭建的 AI 中文语伴预期实现的功能包括三类: 社交功能、教学功能与辅助功能, 具体阐释如下:

3.2.1 社交功能

人机对话功能: 这是最基本的功能。AI 中文语伴应当具备自然语言处理能力, 可以与学习者进行流畅的对话。这不仅限于简单的问答, 还包括进行深入的讨论和交流。此外, AI 中文语伴还要根据历史记录识别用户的语言特点和表达习惯, 从而更好地理解用户的意图, 提供更准确的回复和建议。

情感交互功能: AI 中文语伴与搜索引擎的不同就在于 AI 中文语伴能够提供更加人性化的回答。AI 中文语伴应当具有情感表达能力, 可以从学习者的输入中感知学习者的中文学习过程中的情绪变化, 并据此给予不同的回应, 与学习者建立情感连接, 增强学习者的学习体验。

3.2.2 教学功能

知识问答功能: AI 中文语伴应具备回答中文学习者提出的各种问题的能力, 准确、及时地进行中文知识问答服务, 帮助中文学习者解决各种疑问和困惑。并根据反馈, 提供更加全面、精准的答案。

个性化学习支持功能: AI 中文语伴应该可以根据学习者的学习需求和中文水平, 为学习者推荐适合的学习资源和学习方法, 帮助学习者建立个性化的学习计划, 并提供针对性的学习建议和指导, 从而帮助学习者提高学习效果。

3.2.3 辅助功能

多语种支持功能: AI 中文语伴应具备多语种翻译能力, 实现中文与其他语种之间的即时翻译, 允许学习者需要的情况下借助其它语言理解中文。

3.3 基于低码态模式的 AI 中文语伴开发

基于本研究的研究目标, 本研究使用百度智能云千帆 AppBuilder 智能体构建平台^④提供的服务搭建 AI 中文语伴。该平台为开发者提供多种开源的应用代码框架, 本文选择 Agent Builder 为基础搭建 AI 中文语伴。

低码态的开发包括“基础模式(零代码)”和“工作流模式”, 基础模式创建只需要开发者进行提示词的编写, 工作流模式创建则还需要开发者进行流程设计。低码态下两种创建模式的开发页面如图 2、3 所示。

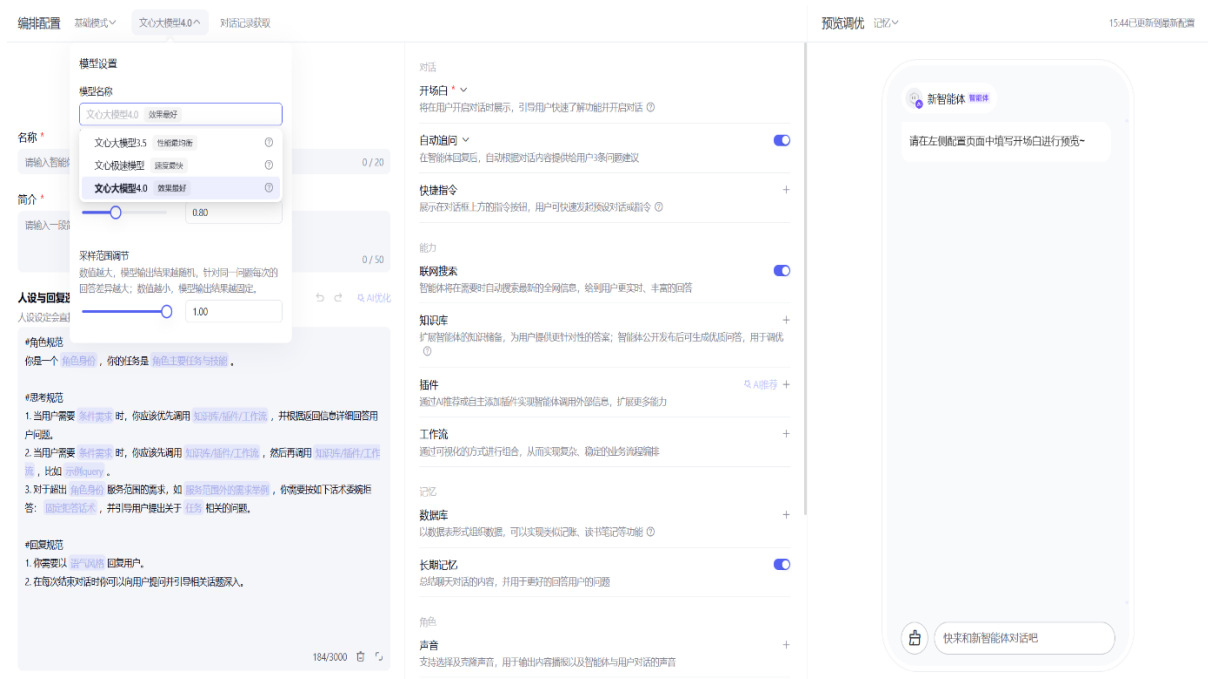


图 2 “零代码模式”开发界面

^④ 平台信息参见: <https://appbuilder.cloud.baidu.com>



图3 “ workflow 模式”开发界面

本研究中搭建的 AI 中文语伴基于 ERNIE-4.0-8k（文心一言大模型 4.0），模型默认“多样性调节”参数为 0.8、“采样范围调节”为 1.0。为了控制生成内容适合学习者，本实验对两个参数进行了测试，发现当“采样范围调节（随机）”为 1.0 时，每次生成的回答差异性略大，故将该值降低为 0.8，测试发现将采样范围下调为 0.8 后的 AI 中文语伴多次生成的效果更稳定，更符合学习者的学习需求，因此将两个参数均设置为 0.8 进行实验。

本研究选用低码态模式下的 workflow 模式进行 AI 中文语伴开发，workflow 允许用户精细控制每一步的逻辑和输出，这一能力提高了 AI 应用的稳定性和可复现性。通过 workflow 的搭建，可以让智能体更高质量的处理复杂任务。首先对 AI 中文语伴的基本信息、开场白与推荐问题进行设置，说明该 AI 中文语伴的使用场景；接着，针对研究目标，对角色指令做出修改，明确其作为中文 AI 中文语伴陪伴中文学习者进行中文学习的定位，并丰富其功能，如纠正语法错误、提供学习资源与建议、设计互动游戏和挑战等；然后，在“知识库”处上传包含国际中文教育领域知识的文档，使 AI 中文语伴的回答更加专业。

3.4 基于代码态模式的 AI 中文语伴开发

百度提供了多种基线模型供开发者选择，如 ERNIE-3.5-8k、ERNIE-4.0-8k、ERNIE-Speed-128K 等文心一言大模型（不同模型的选择可见图 2、图 3）。为了与低码态下开发的 AI 中文语伴对比更加严谨、可信，通过代码态模式搭建 AI 中文语伴时仍使用低码态搭建 AI 中文语伴时使用的大模型：ERNIE-4.0-8k。

本研究首先通过百度提供的接口将文心一言大模型接入搭建的 AI 中文语伴, 并将收集到的数据全部上传知识库。交互方式上, 本研究借助 Python 内置的 Tkinter^⑤ 库搭建了一个能与中文学习者进行交互的聊天窗口。

在代码态下, 搭建 AI 中文语伴时必须设置的参数值在编写代码时为默认值, 中文学习者能够进行更多的个性化选择, 根据学习需求对参数进行修改。在代码态开发的 AI 中文语伴中, “随机”“多样”分别代表低码态下的“采样范围调节”参数和“多样性调节”参数, 二者均同上设置为 0.8。“惩罚”通过对已生成的 token 增加惩罚, 减少重复生成的现象, 值越大表示惩罚越大, 即更大程度地避免生成重复的 token, 设置为 1.0; “流式输出”提供了更快的响应时间和更低的延迟, 从而提供更好的使用体验; “人设”并非必须设置的参数, 学习者可以按需灵活设置。对于不了解这些参数作用的学习者, 也可以使用默认参数。聊天窗口中参数设置的示例见图 4。



图 4 代码态的参数设置

3.5 开发过程对比

通过对比使用低码态与代码态两种模式的开发全过程, 本研究发现两种开发模式差异如下:

第一, 在对开发者的数字素养要求方面, 由于低代码平台提供可视化的界面和拖放式设计工具, 低码态开发对开发者编程知识要求较低。只要开发者对于应用功

^⑤ 具体文档参考: <https://docs.python.org/zh-cn/3/library/tk.html>

能有具体构想, 借助平台提供的工具, 即使是对代码一窍不通的人也能迅速做出属于自己的 AI 中文语伴。而代码态开发需要开发者具备深入的编程知识和技能。

第二, 在开发效率方面, 由于平台提供了可视化的界面和预制组件, 减少了编写代码的时间, 低码态开发通常能够更快地构建应用程序。

第三, 在页面美观度方面, 低码态使用网站提供的页面形式, 已经满足 AI 中文语伴的外观需求。但代码态的页面美化工作需要开发者自行设定且操作复杂。

第四, 在功能的灵活性和定制化方面, 由于开发者可以根据具体需求编写自定义的代码, 代码态开发通常能够提供更高的灵活性。而低码态开发受到平台提供的预制组件和界面设计工具的限制, 虽不同平台能做出的 AI 中文语伴也有所不同, 但定制化程度相对较低。

第五, 在后续的可维护性方面, 由于低码态开发时使用的是平台封装好的组件, 操作简单, 可维护性强。而代码态开发因为开发者需要自己去定义代码结构和逻辑, 维护起来相对复杂。

第六, 在开发模式适用场景方面, 低码态开发适用于快速迭代或简单的应用程序, 而代码态开发适用于复杂或需要高度定制化的应用程序。

综上, 两种开发模式的对比见表 1, 这两种开发模式各有优缺点, 选择哪种模式搭建 AI 中文语伴取决于具体需求、时间、资源和开发人员的技能水平。

表 1 低码态开发与代码态开发模式的过程对比

项目	低码态模式	代码态模式
数字素养要求	低	较高
开发效率	高	低
美观度	较高	定制化
灵活性和定制化	较差	高
可维护性	高	较高
适用场景	简单、同质化	复杂、定制化

本研究经过上述开发实践, 得出如下结论: 低码态开发的优势在于能够快速搭建出基本功能并获取反馈, 因此, 低码态开发更适用于初期构建 AI 中文语伴。然而, 随着 AI 中文语伴的进一步发展, 它需要更高度的定制化和功能扩展。此时, 代码态开发模式更为合适。代码态开发拥有更好的灵活性和定制性, 能满足特定的需求, 并针对性能瓶颈进行调优。此外, 由于 AI 中文语伴是一个长期发展的项目, 因此可维护性至关重要, 即使对于代码经验相对较弱的国际中文教师而言, 低码态开发模式同样能够提供较好的可维护性, 以适应未来的需求变化和技术更新。因此, 在开发 AI 中文语伴时, 国际中文教师可以考虑从低码态开发开始, 快速验证概念和构建基本功能, 然后逐步转向代码态开发, 以实现更高度的定制化和性能优化。

4. 两种开发模式下 AI 中文语伴的生成效果评测

本研究从两个维度对两种开发模式下构建的 AI 中文语伴进行评测, 首先, 从社交功能、教学功能、辅助功能三个方面对 AI 中文语伴进行基本功能的评测; 其次, 对低码态与代码态两种开发模式下 AI 中文语伴的生成效果进行评测。

4.1 基本功能评测

在社交功能方面, 两种模式下的 AI 中文语伴均能够实现与学习者进行流畅的问答, 并且在回答风格上具有“人情味”, 温柔地指出了学习者的语法错误, 并根据学习者的输出内容进行提问, 鼓励学习者进行更多输出, 如图 5 所示。

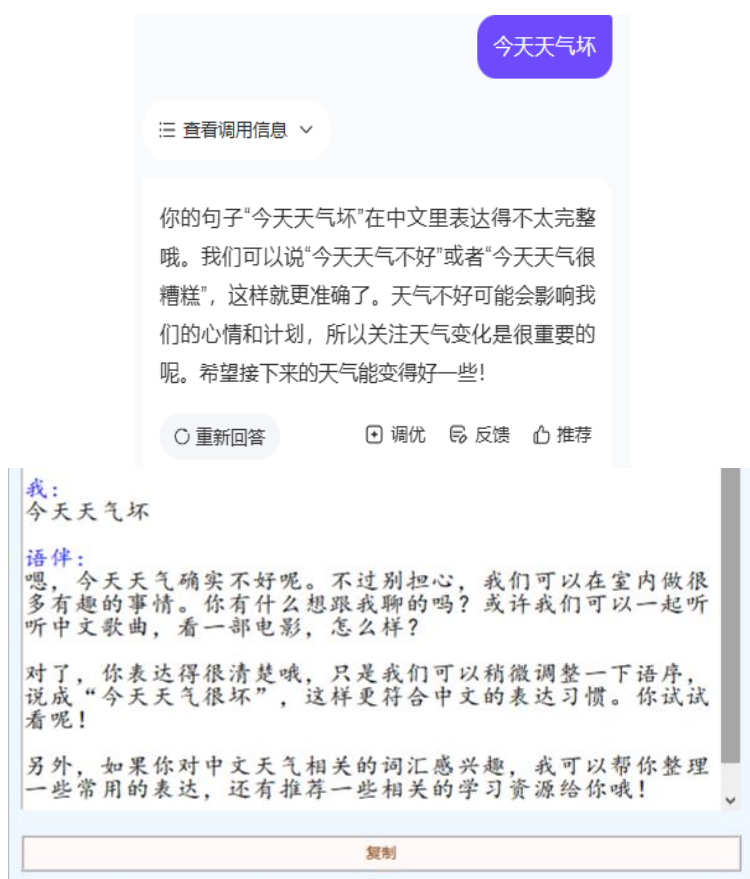


图 5 社交功能展示 (上为低码态, 下为代码态)

在教学功能方面, 两种模式下的 AI 中文语伴均能够妥善回答学习者提出的问题, 并根据学习者的学习目标与时间预算为学习者制定学习计划供学习者参考, 如图 6 所示。

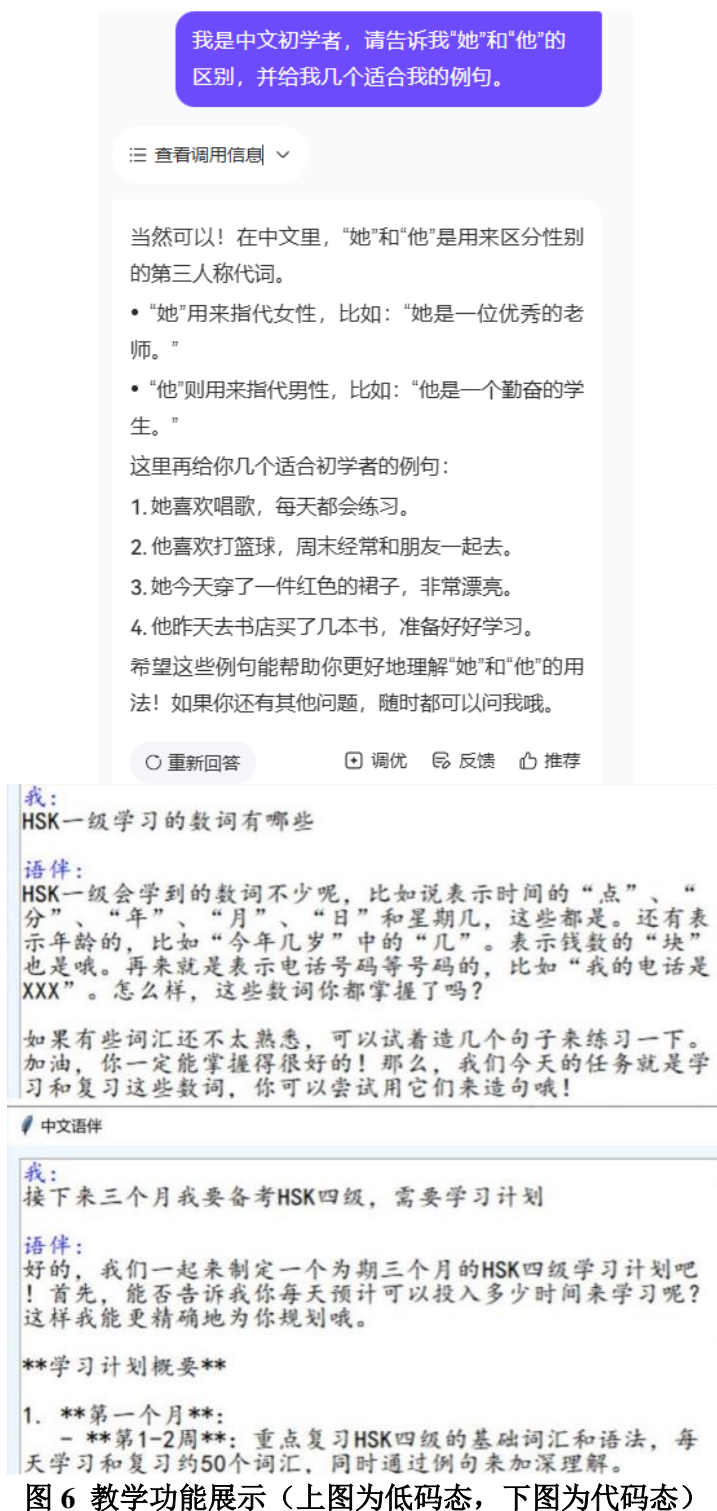


图 6 教学功能展示 (上图为低码态, 下图为代码态)

在辅助功能方面, AI 中文语伴能够根据学习者需求生成文本, 也可以提供中文与学习者母语之间的翻译, 帮助学习者从母语角度理解中文。如图 7 所示, 学习者可以利用 AI 中文语伴辅助学习 HSK 考试的作文部分。当学习者无法理解 AI 中文语伴的回答时, 可以要求 AI 中文语伴将回答翻译为学习者更加熟悉的语言。

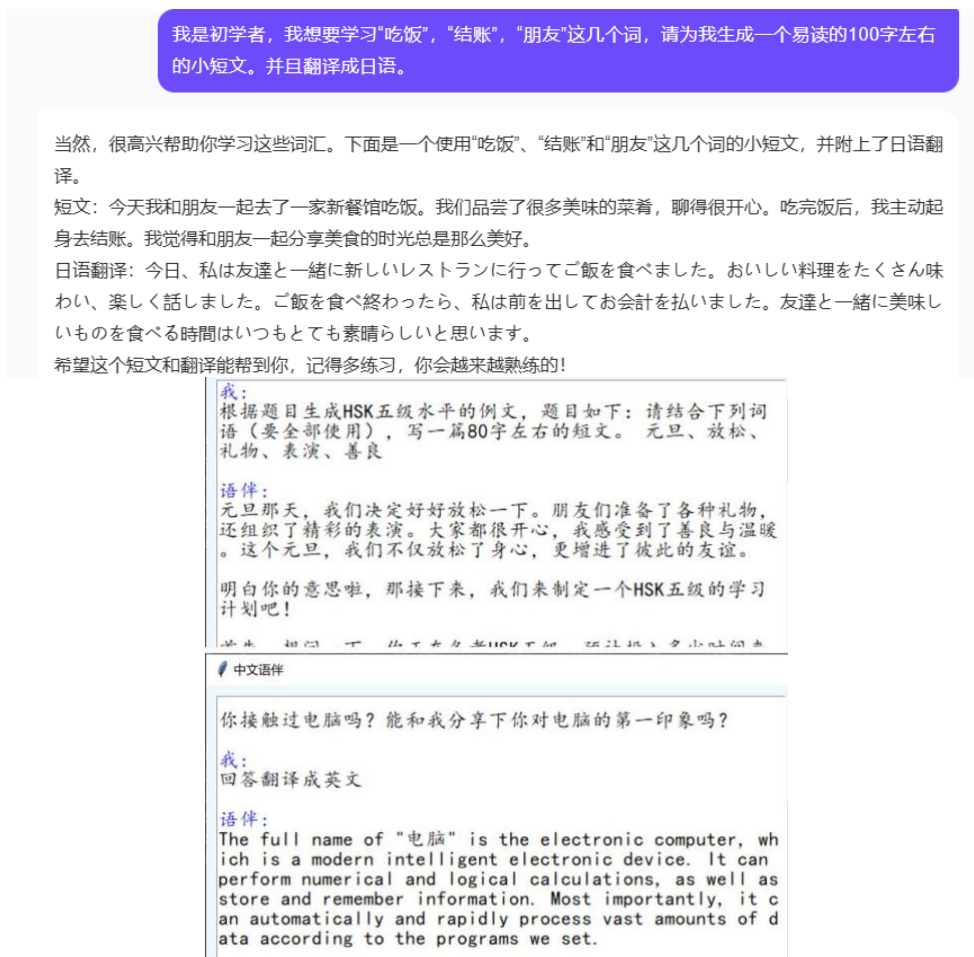


图7 辅助功能展示(上为低码态, 下为代码态)

综上所述, 两种开发模式下开发的 AI 中文语伴均具备 AI 中文语伴的基本功能, 且能够胜任作为 AI 中文语伴的基本任务, 进而可以对开发过程、生成效果进行对比。

4.2 生成内容分析

为进一步检验不同开发模式下研制的 AI 中文语伴在与中文学习者互动中的有效性差异, 本研究调研了三类主要问题场景, 并利用构建好的 AI 中文语伴多次生成答案进行评测分析。本研究面对三类问题场景, 各生成了 10 份不同问题的答案文本, 如分别询问不同等级 HSK 考试的备考建议等, 共计 30 份。由于篇幅原因, 仅展示每类问题的一份答案文本, 具体问题设置和 Prompt 说明如下 ([input]均为用户输入的问题, 生成效果分别见表 2、3、4):

第一类为“建议类问题”, 旨在模拟学习者寻求备考建议的情境, 例如问题: “我现在正在备考 HSK4 级, 你能给我一些备考建议吗?” 在该情境中, Prompt 设置围绕 HSK 备考策略展开, 以引导 AI 生成与考试相关的建议和复习计划, 如“[input],

请给我一些学习建议。请根据我的学习需求, 提供合适的学习计划、复习重点或方法, 帮助我更有效地进步。”

第二类为“对话类问题”, 模拟学习者与 AI 进行人机对话的交流需求, 例如问题: “我们能一起聊聊‘健身’这个话题吗?” 在此类互动中, Prompt 会设置为开放式对话模式, 引导 AI 生成较为丰富的交互内容, 适合具备一定汉语交流能力的学习者, 如“我希望[input]。请用简单易懂的中文与我交流, 使用温和的语气, 并提供有关该主题的相关知识或见解, 帮助我提升中文表达和理解能力。”

第三类为“词义辨析类问题”, 帮助学习者理解常见的词义区分, 例如问题示例: “我不理解‘遇见’和‘遇到’有什么区别, 你能帮我解答吗?” 此类 Prompt 专注于汉语词汇语义的准确解释与辨析, 以满足学习者对具体语言知识的深度需求, 如“你是一名专业的中文教师, 在学习中文时, [input]。请帮助我解释它们的具体含义和使用场景, 并给出相关的用法说明, 以便我更好地掌握这些词汇。”。

通过内容对比本研究发现, 从生成质量来看, 代码态开发模式研制的 AI 中文语伴在人机交互方面的效果更佳。具体来看上述三类问题的答案质量:

表 2 两种开发模式下第一类问题的生成效果示例

低码态开发模式	代码态开发模式
<p>当然可以啦! HSK4 级是一个重要的里程碑, 需要你在词汇、语法和听力理解等方面都有一定的积累。以下是一些备考建议, 希望能帮助你更好地准备考试:</p> <p>首先, 词汇积累是非常重要的。你可以每天设定一个词汇学习目标, 比如学习 20 个新词汇, 并复习之前学过的词汇。可以使用词汇卡片、手机 APP 等工具来帮助记忆。</p> <p>其次, 语法学习也是必不可少的。HSK4 级会涉及一些较复杂的语法结构, 你需要花时间学习和理解这些语法规则, 并通过练习来巩固。</p> <p>另外, 听力练习也是非常重要的一环。你可以多听一些与 HSK4 级水平相符的听力材料, 比如 HSK 真题的听力部分, 或者一些中文广播、电视节目等。</p> <p>最后, 模拟考试也是很有帮助的。你可以找一些 HSK4 级的模拟题来做, 模拟考试的环境和时间, 这样可以帮助你更好地适应考试节奏。</p> <p>除了这些, 还有一些辅助学习工具和资源可以帮到你。比如, 你可以找一些中文歌曲、电影和书籍来培养语感, 提高听力水平。同时, 也可以参加一些在线课程或者学习社</p>	<p>当然可以! 为了更有效地备考, 你能告诉我你预计投入多少时间来复习吗? 这样我可以帮你制定一个更贴合你实际情况的学习计划。同时, 你想先从哪方面着手呢, 比如词汇、语法还是模拟试题?</p> <p>词汇方面, 你可以通过背单词卡片或者使用一些在线词汇学习工具来积累词汇量。</p> <p>语法方面, 可以重点复习 HSK4 级常考的语法点, 并结合例句进行练习, 以加深理解。另外, 做模拟试题也是很有帮助的, 它能让你熟悉考试形式和提升答题技巧。</p> <p>当然, 除了这些备考方法, 我还可以为你设计一些互动游戏和挑战, 让你在轻松愉快的氛围中提升汉语水平。比如, 我们可以玩“你画我猜”的游戏来练习词汇, 或者进行“语法接龙”挑战来巩固语法知识。</p> <p>此外, 我也非常推荐你利用一些优质的学习资源来提高学习效果。你可以看一些中文电影或者电视剧来提升听力和口语能力, 同时也可以通过听中文歌曲来学习新词汇和表达方式。如果需要的话, 我还可以帮你找到一些适合你的在线课程, 让你能够更系统地学习。</p> <p>这些建议对你有帮助吗? 或者你还有其他</p>

<p>群, 与其他学习者一起交流学习心得和经验。</p> <p>那么, 你目前每天大概有多少时间可以用来备考呢? 这样我可以为你制定一个更具体的学习计划。</p>	<p>关于备考 HSK4 级的问题想要了解吗?</p> <p><u>同时, 关于你当天的学习任务, 我们可以这样安排: 首先, 掌握 30 个左右的新词汇, 并通过例句来加深理解; 其次, 重点学习和练习 5 个 HSK4 级常考的语法点; 最后, 做一套模拟试题来检验学习成果。你觉得这样的安排怎么样呢? 或者你有其他想法也可以告诉我哦!</u></p>
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首先, 对于建议类问题, 代码态开发的 AI 中文语伴与低码态开发的 AI 中文语伴均从词汇识记、语法点积累、备考方法等方面给出了建议, 总体上看建议较为宽泛, 但同时, 代码态开发的 AI 中文语伴还为学习者专门制定了每日的备考和学习计划, 详见上表中问题 1 的回答 (下划线部分), 这是低码态的 AI 中文语伴未提供的内容。

表 3 两种开发模式下第二类问题的生成效果示例

低码态开发模式	代码态开发模式
<p>当然可以呀! 健身是一个很好的话题, 它对我们的身体健康和心理健康都有很大的益处。</p> <p>你平时喜欢做哪些健身运动呢? 是喜欢去健身房锻炼, 还是更喜欢在家做一些简单的运动呢?</p>	<p>当然可以呀! 健身真的是个很棒的话题呢。你平时的健身习惯是怎样的呢? 是喜欢去健身房, 还是更偏爱户外运动呀?</p> <p>其实, 我对健身也挺感兴趣的, 虽然平时工作忙, 但我一直都尽量抽时间去做些运动。我觉得健身不仅能让我们的身体更健康, 还能提升我们的精神状态, 让我们更有活力地面对生活中的各种挑战, 你觉得呢? 你有没有发现健身给你带来哪些变化呀?</p> <p><u>(在分享的过程中, 如果出现语法错误, 我会自然地指出并给出正确的表达, 例如: “哦, 你是说‘我觉得健身让我变得更自信了’吗? 这句话用完整的句子表达应该是‘我觉得健身让我变得更有自信了。’很棒的观点!”)</u></p> <p>我们也可以一起制定一个健身主题的中文学习计划。比如, 每周学习一定数量的健身相关词汇和句型, 然后通过对话练习来巩固和运用所学内容。这样既能提升你的中文水平, 又能让你更深入地了解健身这个话题, 你觉得怎么样呢?</p>

其次, 对于会话类问题, 代码态开发的 AI 中文语伴回复的内容长度更长, 既能回复自己对“健身”的感受和喜爱情况, 为学习者提供健身常用的词汇和表达方式; 同时, 也能鼓励学习者勇敢开口, 并为学习者输出的文本提供语法纠错服务, 如上表中问题 2 的回答 (下划线部分), 这些都为语言学习提供了良好的“脚手架”。

表 4 两种开发模式下第三类问题的生成效果示例

低码态开发模式	代码态开发模式
<p>当然可以啦~“遇见”和“遇到”在中文里确实有一些微妙的区别。</p> <p>“遇见”通常用于描述人与人之间的相遇，带有一种不期而遇、偶然相遇的意味，比如“我在街上遇见了一个老朋友”。它更多地强调了一种情感色彩和意外性。</p> <p>而“遇到”则更广泛地用于描述各种情况下的相遇，不仅限于人与人之间，还可以用于描述遇到事情、问题等。比如“我今天在路上遇到了一起交通事故”。它更多地强调了一种客观事实的发生。</p> <p>所以，简单来说，“遇见”更侧重于人与人之间的偶然相遇，而“遇到”则更广泛，可以用于各种情况。</p> <p>希望这个解释能帮助你更好地理解这两个词的区别哦~如果你还有其他问题或者想进一步讨论，随时都可以告诉我哦！</p>	<p>当然可以呀!“遇见”和“遇到”在中文里确实有一些微妙的差异呢。一般来说，“遇见”更强调的是一种偶然或意料之外的碰面，比如你在街上突然碰到了一个久未见面的朋友，这时候用“遇见”就更合适。而“遇到”则更常用于描述碰到问题或困难等情境，比如“我在工作中遇到了一个难题”。简单来说，“遇见”更偏向于人或事物的碰面，“遇到”则更广泛，可以包括各种情况或问题的出现。希望这样解释能帮到你哦!</p> <p>那么，为了更好地掌握这两个词，你可以尝试造几个句子来实践一下。比如：“昨天我在公园里遇见了一个老朋友。”或者“最近我在学习上遇到了一些困难。”这样运用在实际语境中，相信你能更快地掌握它们的用法。</p> <p>另外，中文里还有很多类似的近义词，如果你感兴趣的话，我可以帮你整理一些常见的近义词辨析资料，这样可以帮助你更深入地了解中文的细腻之处。你觉得怎么样呢?</p>

最后，对于词义辨析类问题，使用代码态模式开发的 AI 中文语伴辨析的准确性更高，在对“遇见”和“遇到”这组易混淆词进行辨析时，可以准确指出“遇见”常与人或事物（具有“能够看见”性质义素）的词搭配，而遇到的语义范围更大，能够与抽象名词（如困难、挫折等）搭配，为二者提供了直接、有效地辨析。与此同时，代码态开发的 AI 中文语伴还能够为学习者提供两个词语的例句，这符合了词汇教学“词不离句”的教学思路，也可以帮助学习者了解近义词进入句子（语境）后的使用方法，使静态的词汇知识能够迁移到动态的语境中，让学习者真正掌握词汇的语用知识。

综上，从本研究用于测试基于不同开发模式效果的三类问题来看，可以发现，两种开发模式下的 AI 中文语伴都能够胜任其语伴角色，但代码态下的 AI 中文语伴可以为中文学习者提供更优质、丰富的回答内容。

4.3 生成效果评价

为了探讨国际中文教师和中文学习者使用不同开发模式下的 AI 中文语伴的实际效果，本研究在北京语言大学邀请了 5 位一线国际中文教师以及 5 位非中文专业的外国留学生对两种 AI 中文语伴的回答效果进行评价，并以访问链接和本地运行程序（压缩包）的形式，分别将低码态和代码态开发的语伴交给受调查者试用体验，并将上述 30 份“提问—回答”对文本作为调查内容，让受调查者在阅读完答案文本

后, 对语伴的生成质量进行多维度评价。需要说明的是, 本研究并未告知被试不同回答内容是属于何种开发模式下的 AI 中文语伴生成的, 进而保证了评价结果的客观性与真实性。本研究参考 Chiang (2023) 提出的文本生成质量评估标准对两种不同模式下 AI 中文语伴生成的答案从回答相关程度、回答多元程度、回答准确程度、回答详细程度、回答帮助程度五个维度进行评价, 表中每个评价维度下, 评分前者为低码态得分, 后者为代码态得分, 评分为 5 分制, 1-5 分分别代表程度: 非常低、比较低、一般、比较高、非常高, 具体评分如表 5 所示。

表 5 两种模式下生成的回答评分

	回答相关程度		回答多元程度		回答准确程度		回答详细程度		回答帮助程度	
	低码态	代码态	低码态	代码态	低码态	代码态	低码态	代码态	低码态	代码态
教师 1	4.5	4.5	4	4	4	4	4	4.5	4	4.5
教师 2	3	4.5	3	4.5	4	4	3.5	4	3	4
教师 3	3.5	4	4	4	3	3.5	3	4	3	3.5
教师 4	4	4.5	3.5	4.5	3.5	4	3	4	3.5	3.5
教师 5	3.5	4.5	3	4.5	3.5	4	3	4.5	3.5	4
学生 1	3.5	4	3	3.5	4	4	3	4	3.5	4
学生 2	4	4.5	3	4	4	4	3	4	3.5	4.5
学生 3	4	4	3	4.5	3.5	4	3	4.5	3	3
学生 4	4	4.5	3	4.5	3.5	4	3.5	4.5	4.5	4.5
学生 5	4	4	3	4	4	4	3	4	4	4
均分	3.8	4.3	3.25	4.2	3.7	3.95	3.2	4.2	3.55	3.95

由上表可知, 通过对比可以发现, 代码态下的回答分数相对更高, 这也说明两种开发模式对生成内容质量会产生一定影响, 主要表现在回答内容的详细程度和有用性方面。进一步看, 在受调查者中, 5 位中文教师均认为通过低码态构建的 AI 中文语伴已符合他们的教学需求, 但代码态的回答在五个维度相对更好, 但同时也有教师提出, 代码态 AI 中文语伴生成的回答过多, 可能会对学习者造成认知负担, 希望可以进一步对代码态 AI 进行调整; 5 位外国留学生也认为低码态下的 AI 中文语伴已满足学习需求, 但有 4 位留学生对构建代码态的 AI 中文语伴充满兴趣, 想要进一步定制化开发专属的 AI 中文语伴。

4.4 开发模式择用建议

经过对两种开发模式不同角度的对比, 本研究发现, 两种开发模式在过程和效果上的优势和不足不尽相同, 总体而言, 低码态开发模式具有低耗时的特质, 低码态开发在软件开发和维护过程中均提高了生产力, 且通过预编程的应用组件和数据模型工具, 简化了开发流程, 对于想要实现基础功能且“即插即用”效果的开发基础薄弱的中文教师是个更优的选择。而相应的, 这种开发模式研制的 AI 中文语伴的效果并不优于代码态开发的产品, 对于想要更高定制化的效果则需引入代码态开发模式。

因此, 未来中文教师或学习者在使用两种开发模式时, 可以根据自身实际需求, 灵活选择最适宜的开发模式, 且由于大部分中文教师未曾受过专业的代码训练, 开发能力较弱, 可以优先考虑使用低码态的开发模式, 这种模式同样可以研发出基本胜任语伴工作的智能体。如果教师希望语伴能够更加个性化、智慧化地发挥其教育价值, 需要不断提升自身的数字素养, 特别是数字教学设计能力、数字技术应用能力(方紫帆 & 徐娟, 2024), 或者选择与擅长开发的技术人员合作, 形成教学资源建设共同体, 运用代码态的开发模式协作构建更针对教学需求的 AI 中文语伴。

5. 结论

目前, 在国际中文教育领域, 中文语伴资源存在明显困境。本文从“低码态”和“代码态”两个角度出发, 选择百度文心一言大模型作为 AI 中文语伴的基线模型, 对 AI 中文语伴从设计到具体实现进行了全面的介绍, 并在搭建完成后对两种开发模式下的开发过程和效果进行对比, 得出两种开发模式的利弊所在, 未来开发实践中应当结合二者优点完成 AI 中文语伴的开发。

尽管本研究在 AI 中文语伴方面取得了一定进展, 但在未来仍有许多改进空间, 例如: 第一, 缺少对比分析其他大模型及开发平台。本研究暂未对比其他先进的大语言模型, 如 Llama、GPT-4、GLM 等, 也未涵盖不同开发平台的比较分析。若纳入更广泛的模型和平台比较, 可以进一步为结论进行验证, 提升研究成果的普适性; 第二, 实验覆盖的问题种类不够全面。本研究的实验应用主要集中于三类问题, 这可能限制了对模型在不同问题背景下的表现评估。尽管所选问题具有重要意义, 但未能涵盖更广泛的问题种类可能导致研究结果的适用性受到限制; 第三, 实验所涉及的样本规模相对较小。本研究仅包含 5 位一线教师和 5 位二语学习者。这可能影响结果的统计显著性和可靠性; 第四, 暂时缺乏长期实际效果评估。本研究未能对所开发的智能体进行长期效果的评估, 虽然初步结果显示了模型的有效性, 但长远来看具体应用效果如何不能确定, 这一局限性可能影响对模型实际应用价值的全面理解。

随着人工智能技术的不断进步, AI 中文语伴将成为中文学习者的重要伙伴和支持者, 为中文学习者带来更广阔的学习空间和更丰富的学习资源, 推动国际中文教育的规模化普及和个性化培养并举。

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四大社交媒体在泰国大学生中文非正式学习中的应用研究 ——以孔敬大学和室利佛逝皇家理工大学为例 (Research on the Use of Four Major Social Media in Informal Chinese Learning Among Thai University Students — A Case Study of Khon Kaen University and Rajamangala University of Technology Srivijaya)

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摘要: 随着互联网技术的快速发展,利用网络开展中文非正式学习成为中文学习者在碎片化时间自主学习中文的重要方式。社交媒体以其开放性、共享性、趣味性成为大学生最常用的软件,在非正式学习中发挥着独特作用。本研究采用问卷调查法,了解泰国大学生中文非正式学习中的学习动机、学习需求及对 Facebook、TikTok、Instagram 和 WeChat 四大主要社交媒体平台的选择情况,并对比分析四大主要社交媒体平台在中文非正式学习中的优势和不足。研究发现,大部分泰国大学生出于长远目标的考虑,通过非正式学习来满足扩大中文词汇和深入了解中国文化的目标。最终,大多数学生能够达到增加词汇量和深入了解中国文化的目标。在四大社交媒体平台中,TikTok 的非正式学习用户体验最好,而 Instagram 和微信的用户体验较差。文章最后为社交媒体在中文非正式学习中的有效应用提出了相应对策。

Abstract: With the rapid development of Internet technology, using the Internet for informal learning has become an important way for Chinese learners to learn Chinese independently in fragmented time. Social media, with its openness, sharing features, and entertainment value, has become the most commonly used software among college students and plays a unique role in informal learning. This study used a questionnaire survey to understand Thai university students' motivation, learning needs, and preferences among four major social media platforms (Facebook, TikTok, Instagram and WeChat) in informal Chinese learning, and to compare and analyze the strengths and weaknesses of these platforms. The study found that most Thai university students were motivated by longer-term goals, and the need to expand their Chinese vocabulary and deepen their understanding of Chinese culture through informal learning. Most students were able to achieve these goals. Among the four major social media platforms, TikTok offered the best user experience for informal learning, while Instagram and

WeChat had the lowest user satisfaction. Finally, corresponding countermeasures are proposed for the effective application of social media in informal Chinese learning.

关键词: 国际中文教育、非正式学习、社交媒体

Keywords: International Chinese language education, informal learning, social media

1. 引言

信息化时代下,网络技术的快速发展使得中文学习不再局限于传统课堂学习,非正式中文学习成为中文学习者的补充学习方式。相较于正式学习,非正式学习具有自发性、社会性、形式多样性等特点。中文学习 APP、社交媒体等移动终端被广泛应用于中文非正式学习。目前在国际中文教育领域,有关中文非正式学习的研究多着眼于中文学习 APP 在非正式学习中的应用及其对比分析,而有关社交媒体的研究多关注社交媒体平台资源在课堂教学中的应用及其作用于中文传播、中国文化国际传播的策略和途径。学界对于大学生常用的社交媒体平台在中文非正式学习中的应用情况探讨不足。

目前泰国在校学习汉语的人数超过 100 万,居全球首位(王禹衡&常红,2021)。DataReportal 发布的数据显示,截至 2024 年 1 月,Facebook、Line、TikTok、Facebook Message 和 Instagram 是泰国排名前五的最常用社交媒体平台(Kemp, 2024)。WeChat 则是中国第一大社交媒体(Kemp,2024)。根据笔者在泰国室利佛逝皇家理工大学实习期间所了解到的情况,泰国大学生多用 Line 与家人朋友进行通信,使用 Facebook、TikTok、Instagram 等获取资讯,使用 WeChat 与中国老师、朋友交流。

因此,本研究以泰国大学生为研究对象,从学习需求、用户体验、学习收获等方面对 Facebook、TikTok、Instagram 和 WeChat 开展调查,通过研究结果分析,为泰国大学生更有效地利用社交媒体平台学习中文提出建议。本研究主要探讨以下四个问题:

1. 泰国大学生在进行非正式中文学习时对四大社交媒体的选择情况如何?
2. 四大社交媒体在中文学习资源建设方面有何长处和不足?
3. 泰国大学生在利用社交媒体进行中文非正式学习的学习动机和学习需求是什么?
4. 泰国大学生在利用社交媒体进行中文非正式学习后的学习收获如何?

2. 文献回顾

2.1 中文非正式学习

非正式学习是“相对于正规学校教育或继续教育而言的，指在工作、生活、社交等非正式学习时间和地点接受新知的学习形式”（余胜泉&毛芳，2005）。从主导者的角度来看，非正式学习是由学习者自我发起、自我调控的。从知识获取途径来看，非正式学习具有社会性，知识来源多元化，如家人、朋友和大众媒体等。从学习形式来看，非正式学习的形式多样，既包括自我信息检索，也包括与人交流分享等。从学习目的来看，非正式学习既可以有明确的学习目的，也可以是偶然的（余胜泉&毛芳，2005）。基于非正式学习理论，中文非正式学习是指中文学习者在正式教育之外，通过线上平台或线下沟通，积极主动地、有意识地以自我检索学习资源或学习伙伴共享交流等方式开展中文学习。

研究发现，中文非正式学习的主要途径是中文学习类 APP（张席翠，2023），围绕中文学习类 APP 的研究主要集中在其应用与对比分析两方面。在中文学习类 APP 应用于非正式学习领域，廖雅萍（2021）采用问卷调查、个案研究等方法对汉语学习类 APP 在学习者自主学习中的应用情况进行了调查。调查发现，汉语学习类 APP 在高校留学生中较受欢迎，使用程度较高，对学习者的词汇水平的提高效果显著。然而市面上的汉语学习类 APP 质量参差不齐，而且缺乏针对性，难以契合学习者的学习需求。此外，学习者对这类 APP 的使用缺乏引导，学习过程耗时耗力。在此基础上，廖雅萍分析了影响学习者使用汉语学习类 APP 进行自主学习的因素，并对软件开发者和使用者提出了相应的改进建议。

此外，范思梦（2021）和侯慧奇（2018）采用问卷调查法、访谈法和对比分析法，对两款当前使用率较高的汉语水平考试辅助学习 APP 以及五款主流汉语学习 APP 进行了对比分析，调查了使用者的体验和学习情况，分析了两款软件的优势和不足，为汉语学习软件的设计和发展提出了改进建议。

除中文学习类 APP，中文学习网站、微课、短视频和影视剧也是中文学习者非正式学习的重要来源。董欢欢（2023）通过对 112 名来华留学生的调查发现，使用中文学习平台能够增加学习兴趣、拓宽学习渠道并节省搜集和整理学习资源的时间。刘婷（2016）认为，中文学习者利用学习网站进行非正式学习时，可以自由选择学习方式和学习内容，自主掌握学习进度，还可利用多元化的呈现方式加深理解。吴禹函（2023）指出，微课精炼简洁，解释详尽，环节完整，有助于学生在短时间内掌握核心内容。吴倩（2024）研究了 YouTube 平台上 56 个中文教学频道的中文教学短视频资源，发现这些中文教学短视频具有简短精悍、生动立体、形象直观、趣味性高、定位精准、传播度广等优势。刘艳（2020）通过针对越南中文学习者的个案研究发现，观看中文影视剧不仅能够帮助学习者扩大词汇量、积累常用句式，还能够帮助他们学习中国文化，培养跨文化意识，增强跨文化交际能力。总体而言，中文非正式学习具有形式多样化、内容多元化和选择自主化的优势。

除上述途径外,在二语习得领域,研究发现语言学习者常见的非正式学习方式还包括使用社交媒体进行非正式学习(Soyoo, Reynolds, Vazquez-Calvo, & McLay, 2023)。Lambton-Howard 等人(2021)发现,学习者使用社交媒体进行语言学习的频率高于教师使用社交媒体进行语言教学的频率。Hamat 和 Abu Hassan(2019)面向马来西亚大学生开展了关于大学生如何看待社交网站对学习能力和语言能力作用的相关调查,结果表明,绝大多数大学生利用社交网站学习英语,并认为使用社交网络有助于提高英语熟练度。朱晔(2015)认为,将社交媒体应用到中国的外语教学中,可以通过组织学生开展相关教学活动、学生开展个性化自主学习、多名学生开展合作学习等途径,激发学生的学习兴趣,促进课堂内外的良性活动。Barrot(2022)也通过数据分析证实了社交媒体对第二语言学习的积极影响,并发现 Facebook、Skype、WhatsApp 和 Twitter 等备受瞩目的社交媒体平台仍然备受语言学习者关注,QQ、新浪微博等社交媒体平台由于应用范围的局限性,仍有待进一步探索。

现有研究表明,社交媒体在第二语言学习和教学中发挥着积极作用,但尚未有学者对不同社交媒体在非正式学习中的使用情况开展对比分析。由此,本研究以非正式学习中使用的社交媒体平台为出发点,探究四大主要社交媒体平台在中文非正式学习中的应用情况。

2.2 社交媒体与国际中文教育

社交媒体最早出现于美国学者 Antony Mayfield(2007)的《What is Social Media》一书中。Mayfield 认为,社交媒体具有参与、公开、交流、对话、社区化和连通性的特点,赋予每个人创造并传播内容的能力。由于社交媒体的这些特点,有关社交媒体在国际中文教育领域的研究主要集中在三方面。

首先是社交媒体在中文教学与传播、中国文化国际传播等方面的影响因素、传播策略和传播途径。孙潇雨(2021)及其团队以 Instagram 上的教学账号为研究对象进行了分析,提出应通过增添真实语料、凸显内容特色、精简教学内容和注重基础语言知识等方式来提高教学账号的竞争力。郭薇、于萌(2018)则从传播主体、渠道、受众、机制等角度重点探讨了数字媒介技术推动汉语国际传播的主要策略,包括利用社交媒体平台以强化传播效果、整合数字媒介传播渠道以扩大传播范围,及细分受众以提高传播针对性。

其次是社交媒体平台的使用对留学生跨文化适应的影响。田云飞(2021)和雷晴(2021)分别从跨文化心理与社会适应及跨文化学习适应的角度,研究了微信的使用对兰州地区留学生的影响。研究发现,微信使用动机与来华留学生的跨文化心理适应、社会适应、学习适应均呈正相关,即微信使用动机越强,留学生的适应能力越好。

最后是社交媒体对中文学习效果的影响。Ekaterina Neustroeva(2022)对俄罗斯最受欢迎的社交媒体进行了研究,发现通过社交媒体学习中文能提高俄罗斯学习者

的学习兴趣和学习效率。勾佳琦（2023）针对国内部分汉语学习者的调查显示，基于社交媒体的非正式中文学习具有显著优势，如保持学习趣味性和主动性、利用碎片化时间提高学习效率、提供多样化学习场景让学习者更加自如、提供定制化学习资源让学习者更有针对性地学习、互联网的海量资源让学习者可以查漏补缺。然而，该研究也指出了此类学习的不足之处，如约束力弱、质量参差不齐、原创设计缺乏、知识点混杂、语言不规范、舆论虚假现象以及网络安全隐患。勾佳琦建议应通过学习者、学校、社会、政府和媒体等多方合力进行优化改进。

面对各类社交媒体，国内外学者的研究多集中于 WeChat，指出 WeChat 为中文学习者提供了与母语者互动、接触真实多模态语料和实际使用语言的机会（Jin, 2018; Wang & Jiang, 2022）。Jin（2018）通过对两名来华短期汉语研修生的追踪调查发现，WeChat 聊天功能有助于为学习者与母语者建立休闲空间，进行以意义为核心的交流，还能为学习者提供俗语等中文学习资源。Wang & Jiang（2022）将 24 名来华留学生与母语者配对，利用 WeChat 开展研究，结果显示，WeChat 为学习者提供了互动协作、资源共享、知识内化和构建、可持续学习及友谊维护的机会。Tong 等人（2022）以澳大利亚一所学校为例，研究了 WeChat 班级群对学生中文学习的作用。数据显示，WeChat 班级群能为学生创造使用中文的机会，一个学期后，班级群的参与度和中文使用率都有所提高。

然而，研究者亦提出利用 WeChat 进行语言学习时所面临的挑战。魏聪（2017）调查得知，大部分留学生不知道 WeChat 中有汉语学习资源，说明公众平台的宣传力度不够。使用 WeChat 汉语学习资源的留学生获得公众号的途径主要来自老师或者同学的推荐，而积极主动地搜寻相关的汉语学习资源的留学生很少。魏聪建议 WeChat 公众号创建者们应加强宣传力度，采用更为丰富、灵活的手段来吸引学习者的关注。邱佳荣（2019）的调查同样显示，留学生使用 WeChat 主要基于 WeChat 的聊天功能，利用 WeChat 获取中文学习资源的留学生较少。樊亚南（2019）进一步调查了留学生未通过 WeChat 公众平台学习汉语的原因，发现主要原因是公众平台内容复杂，以至超出了学习者的水平或者学习者对 WeChat 功能了解不够。张玲丽（2022）则发现大部分留学生都关注了中文学习类 WeChat 公众平台，其中绝大部分留学生关注 WeChat 公众平台后，会利用平台进行学习，而小部分学习者则未使用该资源。他们未使用的原因是没有时间、找不到所需资源或寻找所需学习资源过于耗时。

综上所述，现有文献中关于中文非正式学习领域的研究多集中在中文学习类 APP，而对于学习者使用频率最高的社交媒体平台研究较少。少数针对社交媒体平台的研究又聚焦于其在中文与中华文化传播、跨文化适应和学习效果方面。社交媒体作为非正式中文学习的重要工具，其用户体验影响着中文学习效果。然而学界目前对于不同社交媒体平台在中文学习中的使用体验讨论不足，多数研究都将关注点集中在来华汉语学习者使用 WeChat 进行非正式学习的情况上，对于广大海外汉语学习者的使用情况关注较少，忽略了汉语学习者的国别化特点。泰国汉语学习者规模庞大，汉语学习愿望非常强烈。与美国学生相比，泰国学生大多出于语言兴趣和工具需要学习汉语，而美国学生则最看重通过学习所体现的个人价值（陈天序，

2012)。与越南学生相比,泰国学生的汉语学习动机更强、需求面较广,汉语学习必要性和使用机会更高,对中国的兴趣点也更多(赵倩&林昱,2012)。因此,针对泰国学生利用社交媒体开展中文非正式学习的动机、需求、选择倾向和平台评价开展研究,将有助于充分发挥社交媒体平台在泰国学生非正式学习中的作用。

3.研究方法

3.1 调查对象

本次问卷调查选取的对象来自泰国孔敬大学和泰国室利佛逝皇家理工大学。孔敬大学位于泰国东北部,是该区域规模和影响力最大的高等院校。该校专业众多,门类齐全,较早开设中文系,中文课程相对完善,随后还面向所有在校学生开设了中文选修课,中文学习人数随之增加。自2006年起,孔敬大学与中国西南大学合作共建孔子学院,并开展了“2+2”本科生联合培养项目,每年有较多学生前往中国学习。室利佛逝皇家理工大学则位于泰国南部,学生人数相对较少,专业集中在理工类。除中文专业外,该校也面向全校开设了中文选修课,并与中国西南大学和中国重庆邮电大学合作开展“2+2”中文专业本科生联合培养项目,来华留学生数量较多。研究选取这两所大学开展调查,具有一定的代表性。调查对象的专业涉及文史类、理工类、法学类等,年级包含大一、大二、大三等各个年级。调查共回收有效问卷110份。有效样本基本信息表如下。

表 1 有效样本信息表

属性	分类	人数(人)	百分比(%)
性别	男	10	9.09%
	女	100	90.91%
学习中文的时间	1年以内	27	24.55%
	1-2年	23	20.91%
	2-3年	16	14.55%
	3年以上	44	40%
自我评估汉语水平	零基础-HSK1级	35	31.82%
	HSK2级	18	16.36%
	HSK3级	28	25.45%
	HSK4级	20	18.18%
	HSK5级	9	8.18%
	HSK6级	0	0%

3.2 调查设计分析

本次问卷调查分为四个部分,共包含17题。第一部分为个人基本信息,共6题,旨在了解调查对象的性别、学习中文的时长、自我评估的中文水平、是否使用社交媒体平台学习中文、常用于中文学习的社交媒体平台,以及使用频率。

第二部分为学习动机、学习需求及学习收获分析，共3题。主要通过多选题调查学习者利用社交媒体平台自主学习中文的原因、学习需求及学习收获，这些因素共同从学习者自身的角度影响学习者对社交媒体平台的选择。其中学习动机问卷问题的设计基于 Tremblay & Gardner (1995) 的扩展动机理论模式，从语言态度、目标显著性和动机行为三方面设计选项。具体而言，语言态度指对中文或者中国文化的兴趣、对中文老师的喜爱或与中国朋友交流的意愿所反映出的语言态度；目标显著性指希望学习中文知识、提高中文技能等明确的语言学习目标；动机行为指希望能在中国学习、生活或旅行等深层远景目标。学习需求主要涵盖中文语音、词汇、语法以及中国文化等方面的学习资源。学习收获与学习需求相呼应，用于评估社交媒体上的学习资源是否满足了学习者的学习需求。

第三部分基于 Peter Morville (2004) 提出的用户体验蜂窝模型，调查学生在使用 Facebook、TikTok、Instagram 和 WeChat 四大社交媒体平台时的体验反馈，共计8题。用户体验蜂窝模型以价值为核心维度，包括六个次级维度，分别是：有用性、可用性、可寻性、可信度、满意度和可获取（焦婧，刘东&李亚文，2013）。这七个维度共同构成了一个蜂窝状的结构，每个维度都与其他维度相互关联，共同影响用户体验的质量：

- 价值 (Valuable) 指产品或服务为用户创造的价值，使用户愿意为之投入时间和金钱。
- 有用性 (Useful) 指产品或服务是否满足用户的需求、解决问题，或者帮助用户实现目标。
- 可用性 (Usable) 指产品或服务是否简单直观，用户是否容易使用。
- 可寻性 (Findable) 指用户在使用产品或服务时是否能够快速找到所需的信息或功能。
- 可信度 (Credible) 指产品或服务是否让用户相信其信息和服务的真实性、准确性和可靠性。
- 可获取性 (Accessible) 指产品或服务是否能够被尽可能多的用户使用，包括那些具有不同需求和能力的用户。
- 满意度 (Desirable) 指产品或服务是否能够满足用户的需求。

该模型为产品和服务设计提供了一个全面评估、设计的框架。通过关注上述七个维度，设计师可以更好地满足用户的需求，提升产品或服务的体验质量，从而赢得用户的喜爱。由于该模型在用户体验评价中的认可度较高，本研究将结合该模型调查泰国大学生在中文学习中使用这四大社交媒体的体验，以了解其优势与其不足。

除选择题外，该部分还设置了填空题，以便进一步探究特定社交媒体使用体验较差的原因。

3.3 调查实施过程

中文版问卷完成后，笔者借助 Google 翻译将其翻译为泰文版，并请泰国同学核

对翻译,对不准确的部分进行了修改。随后,笔者选取了两位泰国同学进行测试,以确保问卷的实用性和科学性。正式问卷采用问卷星网站(<https://www.wjx.cn/>)制作,并以二维码形式发放给泰国室利佛逝皇家理工大学和孔敬大学的大学生。最终共回收有效问卷 110 份。中文问卷内容详见附录。

4.发现与讨论

4.1 社交媒体在中文非正式学习中的应用分析

4.1.1 社交媒体选择情况

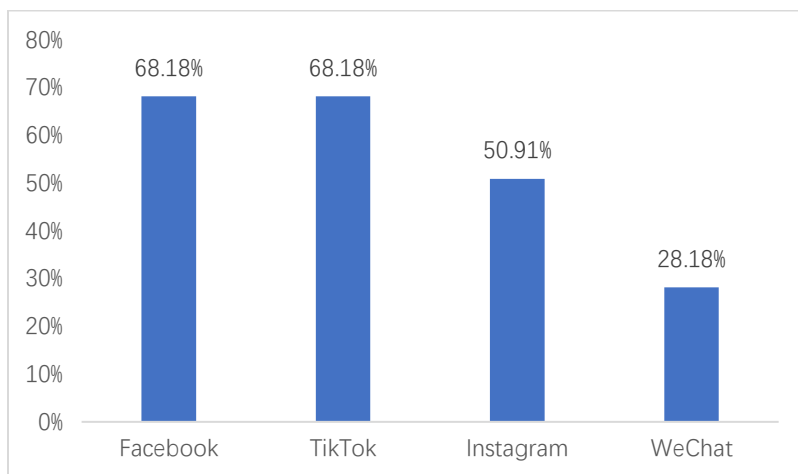


图 1 泰国大学生常用于中文学习的社交媒体选择情况

图 1 显示,在问及最常用于中文非正式学习的社交媒体平台时,选择 Facebook 和 TikTok 的学习者人数最多,二者的使用比例均为 68.18%,其次是 Instagram,使用比例达 50.91%;相较而言,WeChat 使用比例最低,仅为 28.18%。这一发现与前期研究所指出的大部分来华留学生使用 WeChat 进行中文非正式学习的情况不同(张玲丽,2022),反映出 WeChat 应用于中文非正式学习的海外市场还有待开拓。

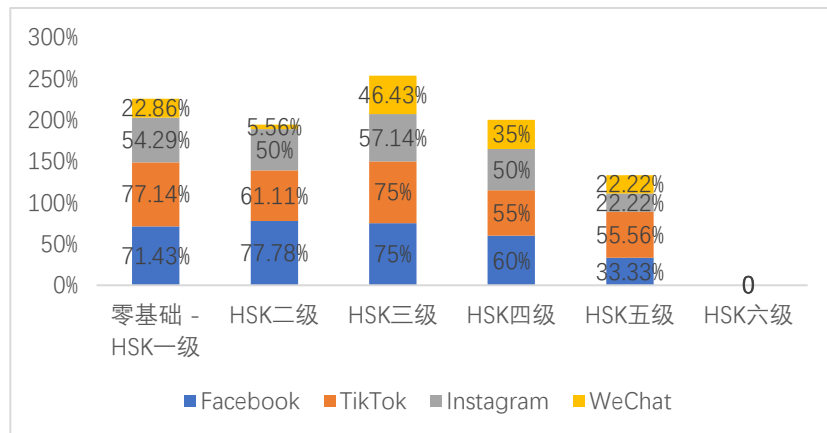


图 2 泰国大学生中文水平等级与社交媒体选择倾向性

通过计算不同语言等级学生使用各社交媒体的比例，可知不同等级学生在社交媒体选择上的倾向性（见图2）。对比各类型社交媒体资源的选择倾向发现，所有水平的学习者都更倾向于选择 TikTok 进行中文学习，而较少使用 WeChat。表2的数据显示，学习者认为 TikTok 具有最为丰富的中文学习资源、学习资源质量最高、学习资源呈现形式最便于学习、操作最为简便，最符合中文学习需求；而 WeChat 则被认为中文学习资源较少、学习资源的呈现形式不便于学习、操作不便。

对比各 HSK 等级学习者选择社交媒体进行中文学习的分布情况发现，零基础至 HSK2 级的学习者在 WeChat 与另三类学习资源的选择上呈现出极度不均衡性；而 HSK3 级以上的学习者，则在四类社交媒体的选择倾向上分布较为均衡。该研究结果表明，随着中文水平的提升，学习者在社交媒体上的选择更加多样化。对于 HSK5 级的学习者而言，选择使用 WeChat 进行中文学习的比例甚至与 Instagram 持平，略低于 Facebook。这在一定程度上表明，HSK5 级学习者开始更为广泛地接触各类中文学习资源，通过中文社交软件获取为复杂的汉语语料，并试图与汉语母语者建立联系进行交际以提升中文水平。但需要说明的是，由于本研究中 HSK5 级的学习者人数较少（仅 9 人），数据可能存在一定偏差，未来需进一步扩大样本量以深入探究。

4.1.2 四大社交媒体平台的优势与不足分析

表 2 四大社交媒体平台的优势与不足

对比项目/平台	Facebook	TikTok	Instagram	WeChat
中文学习资源最丰富	29.09%	42.73%	12.73	15.45%
中文学习资源质量最高	30.91%	37.27%	10.91%	20.91%
中文学习资源最具系统性	46.36%	23.64%	9.09%	20.91%
中文学习资源的呈现形式最方便学习	37.27%	40%	12.73%	10%
操作最简便	32.73%	44.55%	15.45%	7.27%
查找中文学习资源最快捷	44.55%	34.55%	10%	10.91%
最符合中文学习需求	29.09%	48.18%	13.64%	9.09%

表 2 显示，在中文学习资源的有用性方面，学习者普遍认为 TikTok 的中文学习资源最为丰富且质量最高，少数学习者则认为 Instagram 的中文学习资源最丰富、质量最高。在学习资源的系统性方面，更多学习者认为 Facebook 提供的学习资源具有较强的系统性，少数学习者则认为 Instagram 的系统性更为突出。调查结果表明，TikTok 和 Facebook 在有用性方面获得了更多认可，而 Instagram 的认可度较低。这一结果与三大平台的功能存在一定关联。TikTok 和 Facebook 允许上传的视频时长

通常比 Instagram 长。TikTok 的视频最多支持 10 分钟，而 Facebook 则允许视频时长最长为 240 分钟，相比之下，Instagram 的视频时长最长为 90 秒。因此，TikTok 和 Facebook 在视频时长上的宽松性使它们在提供系统化、深入的教育资源时具备更大的优势。在 TikTok 和 Facebook 上，许多账号由具有教学经验的中文教师或者专注中文培训的培训机构运营。此外，Facebook 还设有小组讨论功能，学习者可以在小组内与同伴交流，分享学习资源和学习体验。相较之下，Instagram 用于主要随手记录生活，内容随意性大。因此 TikTok 和 Facebook 在学习资源的质量、数量和系统性上都优于 Instagram。

在可用性方面，分别有 40%和 44.55%的学习者认为 TikTok 上中文学习资源的呈现形式和操作方式最为便捷，仅有少数学习者认为 WeChat 在这方面表现更佳，占比分别为 10%和 7.27%。通过对比 TikTok 和 WeChat 两款软件，我们发现，TikTok 作为定位明确的短视频社交平台，其所有中文学习资源均以短视频形式呈现，且视频时长通常不超过 3 分钟，视听结合的学习形式便于学生记忆学习内容。而 WeChat 上，学习资源多以推文形式呈现，内容以文字为主，视频为辅，对于中文水平较低的学习者来说，这种形式可能难以支持持续学习。此外，TikTok 依托算法推荐机制，能够根据学习者的观看偏好自动推送中文学习相关视频，从而节省了资源搜索的时间。

在可寻性方面，Facebook 获得了较高的认可度，有 44.55%的学习者认为在 Facebook 上查找中文学习资源最快捷，Instagram 和 WeChat 的认可度较低。该调查结果主要与各平台的界面设计和内容系统性有关。Facebook 的界面设计清晰，功能区域明确，学习内容剪系统性强，学习者能够快速找到自己需要的功能并顺利完成相关操作。相比之下，WeChat 相对复杂，手机版 WeChat 以聊天区为主页面，搜索功能居于次要页面，且搜索内容复杂多样，学习者需要经过搜索、定位、反复筛选找所需资源。电脑版 WeChat 的搜索功能、收藏功能和发现功能甚至仅用图标显示，难以被学习者发现并有效使用。Instagram 如前文所述，学习资源随意性大，剪剪系统性不强，因此不便于根据关键词检索特定的学习资源。

在满意度方面，近五成学习者表示 TikTok 最符合自己的中文学习需求，只有不到一成的学习者表示 WeChat 最符合个人学习需求。这一结果既与学习者个人需求有关，还与各社交媒体平台的建设情况密切相关。总体来看，学习者最希望学习的中文资源主要是中文词汇和中国文化，而 TikTok 在学习资源的有用性、可用性和可寻性都表现较好，切合学习者的学习需求，因此满意度较高。而 WeChat 在这三个方面仍有提升空间，因此满意度较低。

综上所述，在 Facebook、TikTok、Instagram 和 WeChat 四大社交媒体平台中，TikTok 的中文非正式学习用户体验最好，Instagram 和 WeChat 的中文非正式学习用户体验较差。

4.1.3 使用社交媒体学习中文的动机分析

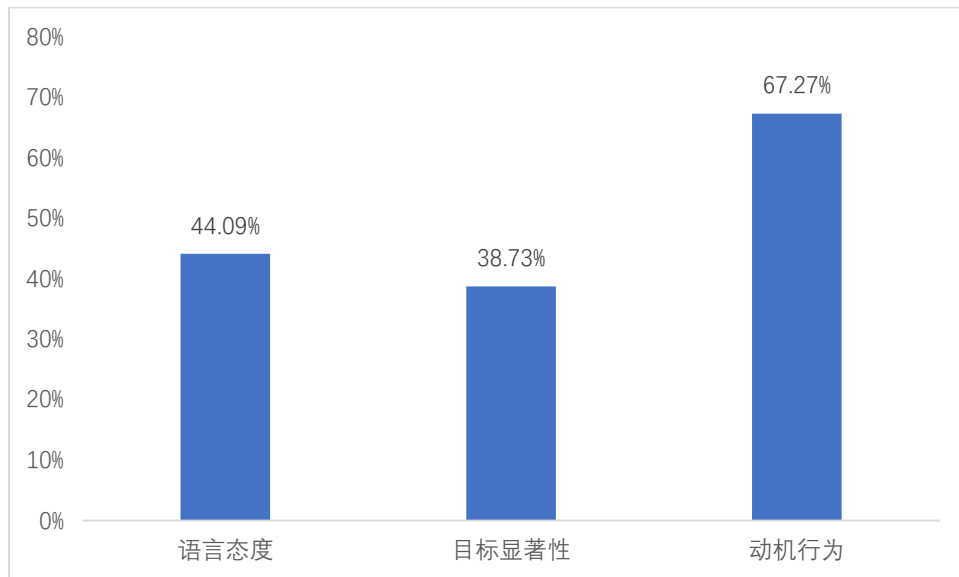


图 3 泰国大学生使用社交媒体学习中文的动机

图 3 显示，学习者使用社交媒体学习中文的动机主要体现在动机行为方面。很大一部分大学生是出于对远景目标的考虑，在课堂外主动利用互联网技术，通过社交媒体平台开展中文非正式学习。学习者对中文的积极态度也推动着他们进行非正式学习。社交媒体平台凭借用户共享的功能，拥有丰富的影音资源，以直观、便捷的方式为学习者提供学习中文和了解中国文化的途径，契合大学生的学习兴趣。

4.1.4 学习需求分析

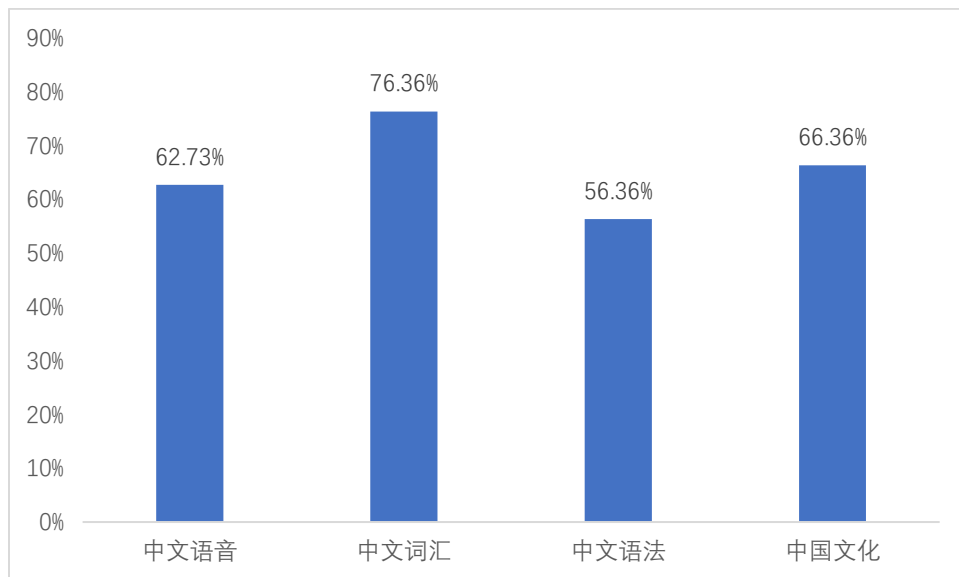


图 4 泰国大学生中文学习需求

图 4 显示,绝大多数(76.36%)泰国大学生希望学习中文词汇,其次,66.36%的泰国大学生希望学习中国文化,62.73%的大学生希望学习有关语音方面的知识,而希望学习语法知识的学习者占比最少。

4.1.5 非正式学习收获分析

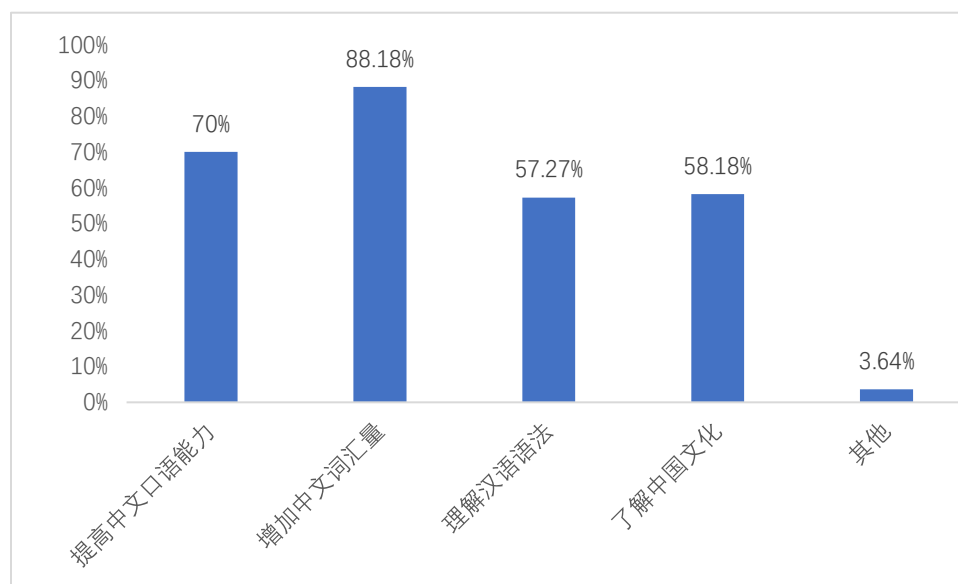


图 5 泰国大学生中文非正式学习的收获

图 5 显示,通过社交媒体学习后,88.18%的学习者认为自己的中文词汇量增加,70%的学习者认为口语能力得到提高。另外,分别有 57.27%和 58.18%的学习者认为阅读能力有所提升和对中国文化有更深入的了解。可见,学习者通过社交媒体进行非正式学习的收获主要集中在词汇方面,其次是口语,文化和语法次之。这一结论与董欢欢(2023)面向来华留学生开展的调查结果一致。此外,还有部分学习者认为社交媒体可以帮助学习中文歌曲或者看懂中文视频,这从一定程度上体现出基于社交媒体的中文非正式学习能增加学习者的词汇、语法知识,提高口语和听力等语言技能。结合中文学习需求分析发现,学习者能根据个人学习动机和学习需求选择合适的社交媒体平台,并达到学习目标。大部分学习者是出于对远景目标的考虑,为满足扩大中文词汇和深入了解中国文化的需求进行中文非正式学习。根据词汇、文化等学习需求,学习者多用呈现方式直观、学习资源丰富的 TikTok 和 Facebook 进行学习,最终实现增加词汇量和深入了解中国文化的目标。

4.1.6 泰国大学生较少使用 WeChat 进行中文非正式学习的原因分析

结合前期调查,笔者初步了解到 WeChat 在泰国大学生中文非正式学习中的应用较少,调查结果也符合笔者的设想。为探究其多方面原因,笔者在问卷中设计了一道主观题,以兼顾学习者的主观因素及其他未考虑到的客观因素。排除掉 25 条无效答案后,笔者得到有效答案共 85 条。调查表明(见下页图 6),21%的学习者在生活中从未使用 WeChat。究其原因,由于 Facebook 等社交媒体已满足与国内朋友交

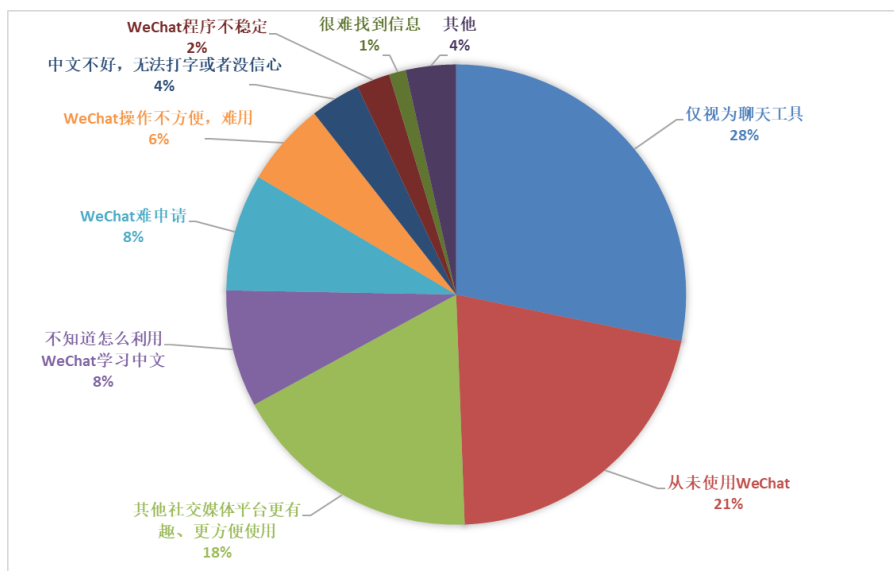


图6 泰国大学生较少使用 WeChat 进行中文非正式学习的原因

流的需求, 因此学习者没有使用 WeChat 的需求, 导致不了解将 WeChat 用于中文学习。28%的泰国大学生仅将 WeChat 视为基本通讯工具, 用于与朋友聊天或者与老师沟通。该研究结果与前期来华留学生使用 WeChat 主要是基于 WeChat 的聊天功能 (邱佳荣, 2019) 的调查结果一致。18%的学习者认为 Facebook、TikTok、Instagram 等社交媒体平台更有趣、更方便使用, 因此更倾向于通过这些平台进行中文非正式学习。这表明 WeChat 上的资源趣味性较低, 操作较为复杂。16%的学习者由于 WeChat 的申请难度、操作不便、程序稳定问题等可用性原因而较少用 WeChat 进行中文学习。这一发现补充了张玲丽 (2022) 的研究结果, 即找不到想要的学习资源、寻找所需学习资源花费时间过多等可寻性原因将降低留学生利用 WeChat 开展非正式学习的可能性。8%的学习者表示不知道如何利用 WeChat 学习中文。这与之前研究中学习者不了解 WeChat (魏聪, 2017; 樊亚男, 2019) 的研究结果相呼应。

研究表明, 泰国大学生在中文非正式学习中较少使用 WeChat 可归因于两方面因素。首先, 从功能角度看, Facebook、TikTok 等社交媒体平台已满足泰国大学生的日常社交需要, 因此他们不会再安装 WeChat, 更不会考虑将其用于中文学习。同时, 在学习内容丰富度、趣味性、操作便捷性等方面, WeChat 相较于 Facebook、TikTok 等社交媒体平台存在一定的不足之处。其次, 在 WeChat 的推广策略方面, 学习者普遍存在一种错误认知, 即将 WeChat 视为单纯的通讯工具。许多学习者并不了解 WeChat 中存在提供学习资源的公众号, 这也进一步减少了学习者将 WeChat 作为中文学习工具的可能性。

4.2 社交媒体在非正式中文学习中的有效应用的建议

调查结果显示, 所有受访者均会利用社交媒体平台进行中文非正式学习。为进一步提升中文非正式学习质量, 并充分发挥社交媒体平台在非正式学习中的作用,

笔者结合上述调查结果，从资源提供平台、中文教师和学习者角度提出以下建议。

首先，各社交媒体平台应补足中文资源建设的短板。Facebook 应进一步提升中文资源的丰富度和质量。尽管调查显示，44.55%的学习者认为在 Facebook 上查找中文学习资源最快捷，表明其平台在资源的可寻性方面具有一定优势。但与此同时，认为 Facebook 的学习资源丰富、符合学习需求的受访者均只有 29.09%。由此可见，虽然学习者 Facebook 上查找中文学习资源最快捷，但这些学习资源可能更侧重资讯信息，而专门用于语言学习的内容相对匮乏。这种不平衡导致学习者在搜寻中文学习内容时，虽然能够快速找到相关资讯，但这些资源可能与他们的实际学习需求不完全匹配，尤其是在深度学习中文词汇、语法、语音等专业知识时。因此，Facebook 上的教学账号和学习小组可增加中文词汇、语音、语法相关专业知识的內容。其次教学账号和学习小组发布的学习资源带有随意性特点，质量参差不齐。学习资源应立足学习对象，适合学习对象的水平，符合学习对象的需求。

TikTok 则应注重中文资源的系统性，这将间接提升学习者搜索资源的速度。目前，TikTok 中文教学账号内容繁杂，集中在词汇、语法和中国文化方面。教学账号一方面可通过视频标签化，明确告知学习者学习内容，增强资源的系统性；另一方面，可以提供中文分级内容，方便不同等级的学习寻找到适合自己的学习资源。

Instagram 在资源有用性、可用性和可寻性各方面都需改进，尤其是资源的系统性和质量方面。由于 Instagram 的呈现形式以视频和图片为主，且可通过标签快速汇集平台上的所有相关学习资源，因此该平台上的中文学习资源具有直观、易查找的优势。该平台应立足优势，精简细化学习内容（孙潇雨，2021），提高资源系统性和质量。

WeChat 也应进一步改善各方面功能，重点应放在操作便捷性、呈现形式更符合大学生需求以及加大对利用 WeChat 进行中文学习认知的推广宣传。在操作便捷性方面，公众号在推送文章时可为标题加上标签，从而提高搜索效率。在呈现形式上，正如樊亚南（2019）的调查所示，公众号的中文学习资源过于复杂。多数国内公众号都只使用中文推送中文学习文章或视频，少数公众号使用中英双语，导致泰国学生无法完全理解学习内容。因此，我们建议公众号充分考虑不同母语背景学习者的学习需求，适当采用泰语作为媒介语，推送易于泰语母语者阅读的中文学习文章和视频。此外，与魏聪（2017）调查结果一致，由于 WeChat 是中国社交媒体，泰国学生对其知之甚少，建议中文学习账号在 Facebook、TikTok 等泰国学生熟知的社交媒体平台上投放介绍使用 WeChat 进行中文学习的视频教程，以扩大 WeChat 在中文非正式学习领域的影响力。

其次，中文教师应积极探索引导学生利用社交媒体自主开展中文非正式学习的多种形式。使用 WeChat 汉语学习资源的留学生获取公众号的途径主要来自老师或者同学的推荐（魏聪，2017）。中文教师可以向学生介绍不同社交媒体，尤其是 WeChat 的学习资源、操作方法及其特点，引导学生选择合适的社交媒体进行学习。利用 WeChat 聊天功能进行一对一聊天或者利用 WeChat 班级群开展非正式聊天，能够为

学习者提供利用中文进行互动交流、可持续学习和建立友谊的机会 (Jin,2018; Wang & Jiang, 2022; Tong, Yin, & Tsung,2022)。中文教师可以在社交媒体上建立班级群或将学习者与母语者配对, 鼓励学生用中文交流, 提高中文的课外使用率。

最后, 大学生应积极探索新的学习方式, 如 WeChat 的公众号和“看一看”功能, 跳出 WeChat 只能用于聊天的误区。希望通过这些途径, 社交媒体平台在中文非正式学习中能得到更有效的使用。

5. 结语

本研究采用问卷调查法, 了解泰国大学生中文非正式学习中的学习动机、学习需求及对社交媒体平台的选择情况, 对比分析 Facebook、TikTok、Instagram 和 WeChat 四大主要社交媒体平台在中文非正式学习中的优势和不足。研究发现, 大部分泰国大学生是出于远景目标的考虑, 为满足扩大中文词汇和深入了解中国文化的需求进行非正式学习, 最终多数能达到增加词汇量和深入了解中国文化的目标。在 Facebook、TikTok、Instagram 和 WeChat 四大社交媒体平台中, TikTok 的非正式学习用户体验最好, Instagram 和 WeChat 的非正式学习用户体验较差。中文学习资源的有用性、可用性和可寻性较低以及主流推广宣传策略导致的认识误区是 WeChat 较少被泰国大学生用于中文学习的主要原因。为提高中文学习者使用社交媒体进行非正式中文学习的质量, 社交媒体应加强平台有用性、可用性和可寻性建设, 中文教师应为学生利用社交媒体开展非正式学习提供适当指导, 学习者应积极探索新的学习方式。

但调查对象覆盖面较窄, 集中在泰国孔敬大学和室利佛逝皇家理工大学。在未来的研究中, 可扩大样本范围, 增加样本数量, 以提高研究的普遍性。调查问卷的问题设计亦可进一步完善。此外, 在外语学习过程中, 考虑到性别社会化过程、课堂实践和外语学习过程的独特性, 大部分情况下女性学习者多于男性学习者 (Piechurska-Kuciel, 2012), 这导致本文的参与者性别分布不平衡, 可能对研究结果造成偏误。本研究仅涵盖四大社交媒体, 未来的研究可以进行探索性调查, 以全面了解泰国大学生用于中文非正式学习的所有社交媒体平台。

本研究考察了四大主要社交媒体平台在中文非正式学习中的优势和不足, 并为其有效应用提出了对策。在未来的研究中, 可针对特定社交媒体开展案例分析、问卷调查和访谈调查, 进一步探索其在中文非正式学习中的作用和改进策略。此外, 由于目前的研究缺乏对其他国家学习者使用社交媒体开展中文非正式学习的探讨, 这使得我们无法确定其他国家是否存在相同或不同的研究结果。因此, 未来可进行更为广泛的研究, 以便对不同国家的学习者进行差异化比较。

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附录

《四大社交媒体在泰国大学生中文非正式学习中的应用研究》调查问卷（中文版）

亲爱的同学：

您好！本次问卷调查是为了研究泰国大学生中文非正式学习中对四大社交媒体平台的选择情况，问卷采取无记名方式，且仅用作学术研究，答案无对错之分，请真实放心作答，感谢您的支持和配合！

一、基本情况

1. 您的性别是？（单选）
 - A. 男
 - B. 女
2. 您学习中文的时间是？（单选）
 - A. 1 年以内
 - B. 1-2 年
 - C. 2-3 年
 - D. 3 年以上
3. 您自我评估的中文水平是？（单选）
 - A. 零基础-HSK1 级
 - B. HSK2 级
 - C. HSK3 级
 - D. HSK4 级
 - E. HSK5 级
 - F. HSK6 级
4. 您是否使用社交媒体平台学习中文？（单选）
 - A. 是
 - B. 否
5. 您常用于学习中文的社交媒体平台是？（多选）

- A. Facebook
- B. TikTok
- C. Instagram
- D. WeChat

6. 您在常用社交媒体上学习中文的频率是？（单选）

- A. 每天
- B. 每周使用 5-6 天
- C. 每周使用 3-4 天
- D. 每周使用 1-2 天
- E. 每个月使用几天

二、学习者需求情况

7. 您利用社交媒体自主学习中文的原因是？（多选）

- A. 对中国文化（包括影视、歌曲、明星等）感兴趣。
- B. 觉得中文很有意思。
- C. 喜欢教授中文的老师。
- D. 希望认识中国朋友。
- E. 拓展中文知识。
- F. 提高口语表达能力。
- G. 提高阅读能力。
- H. 提高写作能力。
- I. 学习中文能获得成就感。
- J. 希望学好中文，以后到中国生活、学习或旅游。

8. 您希望在社交媒体上学习的中文资源类型主要是？（多选）

- A. 中文语音
- B. 中文词汇
- C. 中文语法
- D. 中国文化

三、主要社交媒体平台情况

9. 您认为在以下社交媒体平台中，中文学习资源最丰富的是？（单选）

- A. Facebook
- B. TikTok
- C. Instagram
- D. WeChat

10. 您认为在以下社交媒体平台中，中文学习资源质量最高的是？（单选）

- A. Facebook
- B. TikTok

- C. Instagram
- D. WeChat

11. 您认为在以下社交媒体平台中，中文学习资源系统性最强的是？（单选）

- A. Facebook
- B. TikTok
- C. Instagram
- D. WeChat

12. 您认为在以下社交媒体平台中，中文学习资源的呈现形式最方便学习的是？（单选）

- A. Facebook
- B. TikTok
- C. Instagram
- D. WeChat

13. 您认为在以下社交媒体平台中，操作最简便的是？（单选）

- A. Facebook
- B. TikTok
- C. Instagram
- D. WeChat

14. 您认为在以下社交媒体平台中，查找中文学习资源最快捷的是？（单选）

- A. Facebook
- B. TikTok
- C. Instagram
- D. WeChat

15. 您认为在以下社交媒体平台中，最符合您的中文学习需求的是？（单选）

- A. Facebook
- B. TikTok
- C. Instagram
- D. WeChat

16. 您较少使用 WeChat 学习中文的原因是？（填空）

四、学习效果

17. 根据您的自我评估，您在社交媒体平台上自主学习中文的收获是？（多选）

- A. 中文口语能力得到了提高。
- B. 中文词汇量增加。
- C. 对中文语法掌握得更好。
- D. 对中国文化有更多了解。
- E. 其他（选填）

数字词典：在对外汉语教学中的类型、特征和应用 (Digital Dictionaries: Types, Features, and Applications in Teaching Chinese as a Foreign Language)

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摘要：尽管词典在外语学习中起到了关键的作用，并且如今在课堂中不可避免地会使用科技作为辅助，但现阶段并没有关于中文数字词典使用的具体研究。因此，本研究的主要目标是对部分具有代表性的数字词典样本进行混合分析，分析其类型、特点及其在中文作为外语教学中的潜在应用。为此，笔者从 51 部数字词典中抽取样本，创建了一个电子表格，记录了通过详尽的定性分析得到的数据。结果表明，数字词典的功能除了单纯查找单词释义以及在其他语言中的对应词，在其他诸多方面同样提供了可能性。然而，研究的语料库中的作品在信息质量、功能、适应用户的个人情况或需求等方面存在差异。总之，这项研究为中文作为外语的教学过程中提供了一些贡献，它为根据不同的分析参数评估词典的质量和适应性建立了标准，从而使得学生能够根据自己的水平和需求更好地选择词典。

Abstract: Despite the fact that dictionaries play a key role in learning foreign languages and technology is now unavoidably present in our classrooms, to our knowledge there are no specific studies available regarding the multiple uses of digital dictionaries for Chinese. Consequently, the primary objective of this work is to conduct a mixed-method analysis of a representative sample of digital dictionaries in terms of typologies, characteristics, and possible applications in teaching Chinese as a foreign language. To achieve this goal, a spreadsheet was created using a sample of 51 dictionaries, where the data resulting from a thorough qualitative analysis were recorded. The results indicate that digital dictionaries offer numerous possibilities beyond merely looking up word meanings and their equivalents in other languages. However, the works in our corpus vary significantly in terms of informational quality, functionalities, and suitability for different user profiles and needs, among other factors. In conclusion, this research contributes to the field of teaching Chinese as a foreign language by establishing criteria for evaluating the quality and suitability of dictionaries based on various analytical parameters, thereby enabling better selection of resources according to our student profile and needs.

关键词: 对外汉语教学、数字词典、语言技能、e-Chinese 资料库

Keywords: Teaching Chinese as a Foreign Language, digital dictionary, language skills, e-Chinese Tools

1. 引言

数字词典不仅是词典学资源，也是语言能力发展的重要工具，抑或是文化水平扩展的有力助手。因为它们可以为学生提供关于某一知识层面的全面信息，帮助其深入学习。根据笔者对在西班牙学习中文的学生们的观察，部分学生反馈了学习资源不足的情况，或是找不到适合自己的中文学习工具。尽管目前存在许多关于数字词典在英语学习中的研究，且研究表明电子词典在英语学习的过程中效果显著（Dashtestani, 2013），例如，Toghyani Murnani（2015）通过对 100 名英语学习者关于数字词典是否能够提升学习效率做出的实验表明，数字词典帮助学生克服词汇风格和用法的问题，为学生英语学习提供了很大的帮助，但与此同时，学生需要掌握合适的词典运用方法。但笔者没有发现关于数字词典在中文学习与教学中应用的相关研究。金沛沛（2016）在对外汉语学习词典中的研究中指出，研究用户如何在语言学习的过程中使用词典非常重要，但很少有专家对词典在中文学习与教育方面做出研究，大部分学者仍然将重心放在词典的文本描述与评估上。数字词典数量的庞大可能会使用户感到困惑，并增加选择的难度，尤其是对于缺乏经验的用户而言。谢天蔚（2010）指出，学生选择词典时往往会依据个人喜好，无论是付费还是免费词典，而非考虑教师的建议。在这种背景下，由于每部词典都有其独特的设计与功能，笔者决定分析此类作品的一些代表性样本，探讨其在中文作为外语教学中可能提供的类型、特点和应用。定量分析结果提供了当前数字词典的市场概况，而定性分析则作为一种有效工具，帮助用户有依据地选择那些在基本功能上质量更高、且具有附加价值的作品。

本研究分为五个部分。除引言外，还解释了理论-方法框架。接下来展示了定性与定量分析的结果，随后是主要结论。最后附有参考文献以及两个附录，其中一个包含研究中所涉及作品的列表及相应链接，另一个则为每个分析方面精选的三个最佳词典资源。

2. 理论和方法框架

本研究选取了 51 部数字词典作为研究对象，这些词典于 2024 年 2 月 16 日从 e-Chinese Tools 数据库¹中导出（Rovira-Esteva et al. 2021-24）。e-Chinese Tools 是一个开放获取的数据库，专注于收集和描述中文作为外语学习的资源，由巴塞罗那自治大学的一个研究团队开发。这是一个不断更新的资源库，目前包含 500 多个资

¹ 数据库的访问链接为: <https://doi.org/10.34810/data1405>

源，其中包括应用程序、社交网络、插件、网站、YouTube 等。所有资源均由专家进行评估。

关于词典类型的研究多种多样，研究者从不同的角度和标准对其进行了细致的分类。在本研究中，笔者参考了关于词典分类与分析的前期研究（Farina, 1995; Landau, 2001; Morán, 2005; 陈炳超, 1990; 王德春, 1980; 章宜华, 2004, 2007），结合了与中文作为外语学习中的具体语言能力发展相关的其他标准，总共纳入了 33 个分析参数。Shcherba（1974）在其研究中首次提出了字典编纂中的参数化理论，并将字典分类为六种类型：学术词典、查询词典、百科全书、通用词典、综合词典、概念词典、详细词典、翻译词典、历史词典和非历史词典。这一理论在后续总结的分析参数中得到体现。根据翟艳（2010）所指出的，在语言教学方法中，交际方法认为语言是最重要的工具，这是语言的基本功能。关键在于研究如何将语言作为一种交流工具，以口头和书面形式呈现。因此，在分析在线词典时，语言能力将是一个关键评估标准。结合上述学者总结的词典分类标准，笔者将语言能力细分为语音、写作表达、字形能力、词汇能力、翻译能力、文化能力，作为数字词典的分析标准之一。本文研究的 33 个分析参数主要包括：资源的格式与访问方式（在线或离线）、工作语言（单语、双语或多语）、语言模式（普通话或方言）、主题（通用或专业化）、拼音的使用情况、语言能力（语音、写作表达、字形能力、词汇能力、翻译能力、文化能力）、用户群体、检索方式、例句的包含情况、信息分布、是否包含图像、视频或歌曲、查询的便捷性、个性化设置、用户的自由交互以及翻译服务。总之，基于从 e-Chinese Tools 中获得的 51 个数字词典的数据，笔者创建了一个电子表格，记录了对每个词典进行详细定性分析后得到的信息（见附录 1）。为了便于读者快速查找相关词典，笔者将研究中收录的词典 URL 整理成表格，并将其以附录 2 的形式呈现。

3. 研究结果

在本章中，笔者将详细介绍从数据库中获得电子词典样本的定量分析结果。在本研究进行时，电子汉语工具数据库共收录了 59 部电子词典。其中一些电子词典由于条目重复或链接失效而未被纳入本次分析，因此本文总共收录了 51 部电子词典。本文研究结果基于 2024 年 1 月 23 日至 2024 年 3 月 25 日收集的研究数据。

1) 访问格式和类型

在研究样本的 51 个数字词典中，31 个（60.78%）为网页词典，14 个（27.41%）为手机应用程序（其中一个也提供网页格式），另有 7 个（13.72%）为浏览器插件。本文研究的数字词典插件运用于浏览器、文字处理软件或翻译工具中，通常能够为用户提供快速查询单词、翻译网页或处理文档，无法单独使用。而

数字词典的应用程序通常安装在手机或电脑中，可单独进行使用。两者存在使用上的差异。也就是说，尽管目前数字消费主要通过手机应用进行，尤其是在年轻人群中（Puro Marketing, 2013; iab Spain, 2024），但大多数词典仍采用网页格式。在赵倩倩（2012）关于 71 名大学生词典使用情况的调查中，结果也显示，学生使用最多的词典类型为应用程序，在 71 名学生中，43 人表示习惯使用应用程序，仅有 3 人通过网页访问词典。

研究中的所有数字词典都能够在线使用。尽管大多数依赖于互联网连接，以便随时获取更新的内容，但其中 29.41% 的词典既可以在线使用，也可以离线使用，以便用户拥有更为灵活的使用体验。

同时，笔者研究了在 51 个数字词典中，对用户注册或订阅有要求的词典占比。研究结果表明，有 3 个（6%）的数字词典需要用户进行登录或订阅后才可使用。

2) 依据词典所提供的语言：单语、双语或多语区分

在所分析的 51 个数字词典中，有 20 个是单语词典（39%），27 个是双语词典（53%），4 个是多语词典（8%）。也就是说，少于一半的词典仅以中文为媒介语言，一半的词典提供两种语言，其中绝大部分双语词典使用的是中文与英文，只有一个使用中文和西班牙语。通过这些数据可以看出，数字词典主要为单语和双语词典，而多语词典相对较少。值得注意的是，在 20 个单语词典中，有 12 个并不适合初学者使用，因为大多数涉及中国历史和文化内容。例如《文言文翻译官》和《古代汉语词典》的内容集中于中国古代文学，而《国学大师》则汇集了中国文化的许多不同方面，如民族、历史地名、姓氏等。在双语词典中，只有 7 个词典不适合初学者，所有的多语词典对于各个水平的学习者都适用。从这个角度来看，大多数以英语为媒介语言的词典可供中文水平较低的用户使用。

3) 语言模式：标准语与方言

汉语存在许多地方变体和方言，其中较为广泛使用的包括粤语和上海话。因此，除了世界上最广泛教授的普通话外，还有学生对其中的一些地域方言产生兴趣。在研究的过程中，笔者发现，有一些词典是专门为方言设计的，其中包含词典数量最多的为粤语。在 51 部词典中，有 7 部（14%）专门设计了粤语学习的板块，还有一部词典同时收录了粤语和上海话。尽管在目前的数字词典中，现代标准汉语仍是主要的学习对象，但随着人们对语言多样性认识的提高和学习其他语言的需求，预计以汉语变体为重点的数字词典的发展将根据用户的需求在质和量上有所提高。

4) 词典主题：通用型或专业型

专业词典可以帮助用户查阅某一知识领域中特定术语的含义。在研究中，笔者发现了 13 本（占 25%）具有特定内容的词典，例如，有些词典专注于佛教、谚语、古典汉语或汉字笔画。这些词典的方向通常在其标题中有所体现，例如刚才提及的

最后一种情况的词典名为《汉字笔画查询》。专业词典在学习中文作为第二语言的过程中具有某些优势。例如，在学习与佛教相关的知识时，使用普通词典无法准确找到特定术语的含义，但通过使用 *A Dictionary of Chinese Buddhist Terms*，学生可以查阅到关于佛教词汇准确的定义以及文化知识。

5) 语音能力及拼音

最近的研究表明，语音能力被视为口语表达、听力理解和口头互动的一个关键部分 (Iruela, 2005: 27)。在研究的 51 部词典中，仅有 29 部 (57%) 提供了关于汉字发音的信息，这对初学者来说是必不可少的。

另一方面，汉语拼音的规范使用在中文学习的初期阶段至关重要，因为它是掌握汉字准确发音的工具。此外，现如今信息技术中，最简单且高效的汉字输入方法是基于拼音的，因为它比其他输入方法更快速准确。因此，拼音的官方拼写在学习中文作为外语的背景下具有关键作用。在研究的 51 部数字词典中，有 45 部 (87%) 包括拼音。然而，在这 45 部词典中，仅有 9 部 (20%) 按照官方汉语拼音正字法应用拼音 (中华人民共和国国家质量监督检验检疫总局, 中国国家标准化管理委员会, 2012)。在这些词典中，有四部仅在汉字层面提供了单独的拼音，而非提供词汇或句子的拼音，分别是《笔顺网》、《文言文字典》、《异体字字典》以及《文言文翻译官》；只有三部词典同时提供了词汇和句子的正确拼音，分别是 *Skritter*、*Arch Chinese* 以及 *YellowBridge*。此外，笔者观察到一些词典没有用音标符号标记拼音的声调，而是仅在音节末尾标注了声调对应的数字。

6) 书面表达能力

有多种方法可以提高学生的书面表达能力。根据徐霞 (2016) 的观点，这一点可以通过提高词汇使用的准确性以及通过阅读和批判性思维的学习来实现。在研究的词典中，有六部 (11.7%) 可能对发展这一能力有所帮助，特别是造句网，因为它根据不同的难度和语言能力等级对例句进行了分类，使学生能够根据自己的需求进行查找。

7) 字形能力

与书面表达直接相关的另一项需要特定发展的技能是字形能力，因为掌握汉字的形态音节书写系统与传统的字母书写系统 (如西班牙语、俄语或阿拉伯语) 存在极大区别。在这方面，研究的词典中有 28 部 (55%) 提供了不同类型的相关信息，这些信息可以帮助学生深入理解和掌握汉字的字形和结构。关于字形能力，在此研究中具体细分为词源、笔画数、学习笔画形状的动画，以及识别汉字的语音、语义或部首部分。笔者发现，一些数字词典甚至允许用户练习汉字的书写。

当学生刚开始书写汉字时，可能无法完全识别汉字的所有笔画，并且可能将连笔笔画误认为是一个整体。因此，如果词典提供每个汉字的笔画数，这将有助于他们巩固书写技能（见图 1）。



图 1 《汉字笔画查询》中“吃”字的笔画数、笔顺和笔形信息

在 51 部数字词典中，共有 18 部（35%）包含笔画顺序示例及笔序动画，这对于学生及教师而言都是一个有益的辅助资源。在这些词典中，《汉典》、《懂中文》和 HanYou – Chinese Dictionary and OCR 尤为突出。

在学习汉字过程中，了解汉字的组成可以帮助学生更好地掌握汉字书写系统，特别是汉字的结构（徐权，2024）。掌握的组成部分越多，学习和识别新汉字就越容易，甚至可以推测未知汉字的释义或发音。此外，掌握语音和语义部分有助于区分象形字、会意字、形声字和意符字。在研究的 51 部词典中，有 20 部（39%）提供了这些信息，其中九部显示了语义部分和语音部分（见图 2），其余的则仅标注了汉字部首，即作为词典排序依据的语义部分（见图 3）。



图 2 《懂中文》中“姆”的汉字偏旁部首信息

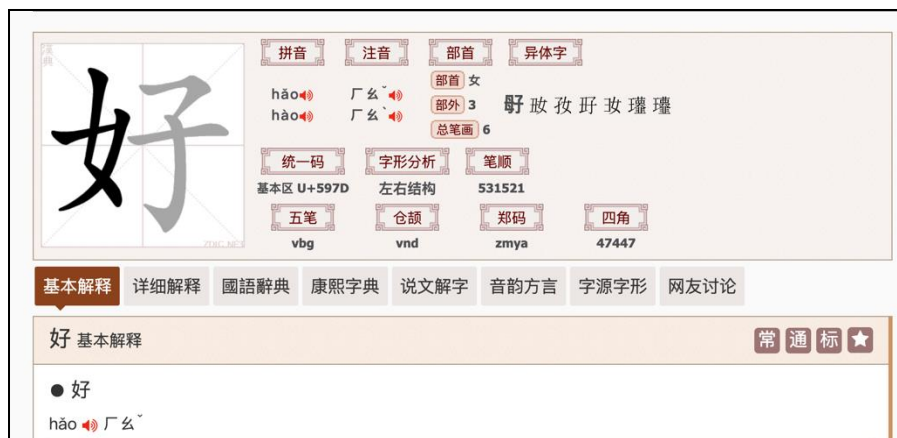


图3 《汉典》中“好”的偏旁部首信息

对于希望深度掌握汉字书写的学生而言，了解汉字的字源，以理解其起源和演变，是一个关键部分。在研究样本中，有 14 部（27%）提供了关于汉字字源的详细解释。通常，这些解释涉及古代汉字的示例，如甲骨文或铭文，或者对汉字在文言文中的释义的解释。《康熙字典》、Yellow Bridge 和《汉典》提供了这类信息，帮助用户了解所学汉字的起源。

在研究的 51 部词典中，包含所有与字形能力相关功能的词典有汉典、懂中文和异体字词典。这三部词典提供了关于汉字组成的详细信息，因此适合希望在字形能力方面得到充分发展的初学者。

8) 词汇能力

新词汇的学习是词汇能力发展的核心。然而，在中文学习的过程中，词汇学习不能仅局限于对词汇的机械记忆而忽视构成这些词的汉字。因此，笔者关注了词典提供的语素信息，即是否标明了构成词汇的汉字的语素负载，以及某一特定汉字-语素可以构成的词汇。在研究的词典中，有 29 部（57%）提供了这类信息。例如，MandarinSpot、OMG Chinese 和 trainchinese 提供了大量可以与每个汉字构成的词汇。此外，这些词汇还附有定义，从而使得扩充词汇量变得更加容易。

研究还检查了词典是否对构成词汇的汉字提供解释，结果发现20部词典（39%）具备这一功能，这有助于学生在学习词汇的同时了解各个汉字的含义。了解一个汉字的释义，可以帮助推断出其他由该汉字构成的词汇的大概含义，如，知道气的意思，可推测出“空气”。这一功能也有助于用户发展联想和推理能力，从而巩固其词汇和形态学能力（见图4）。MandarinSpot、OMG Chinese 和 trainchinese 也提供了每个词汇中构成汉字的单独含义的信息。

COMMON WORDS WITH 空		
🔊	航空 háng kōng	aviation hsk 6
🔊	空军 kōng jūn	air force (空軍)
🔊	空间 kōng jiān	space / room / (fig.) scope / leeway / (astronomy) outer space / (physics, math.) space (空間) hsk 5
🔊	空中 kōng zhōng	in the sky / in the air
🔊	空气 kōng qì	air / atmosphere (空氣) hsk 4
🔊	防空 fáng kōng	anti-aircraft defense
🔊	太空 tài kōng	outer space hsk 6
🔊	天空 tiān kōng	sky hsk 5

图 4 OMG Chinese 中以“空”为语素构成的词

一些词典提供了相关的同义词和反义词，作为词汇学习的补充功能。掌握更多的同义词和反义词可以扩展已知词汇量，有助于避免词汇的重复使用，从而提高书面表达能力。在研究的 51 部词典中，有 11 部（22%）提供了同义词和反义词，尽管每个词汇的同义词和反义词数量不超过十个。例如，《海词词典》、《萌典》和 OMG Chinese 不仅提供了汉字的同义词和反义词，还包括词汇的同义词和反义词。

数字词典所提供的在不同语境下的使用示例可以帮助学生理解词汇的含义及用法，并有助于提高阅读和书面表达能力。在分析的 51 部词典中，有 23 部（45%）提供了例句，这些示例也可以为教师所用，以提供课堂上新词汇的语境化示例。诸如《鱼》、OMG Chinese 和 trainchinese 等词典提供了相关的句子和词汇示例，相比于其他类似作品更具实用性。此外，所有句子都附有英文翻译，这有助于外国学生理解其意义（见图 5）。



图 5 《造句网》提供的句子类型

最后, 一些词典提供了字词的 HSK 等级, 这有助于学习中文的学生更好地区分哪些词汇使用频率更高, 并帮助他们优先安排学习内容。由于当前的 HSK 正在进行改革, 且新标准尚未在全球范围内实施, 因此研究假定词典使用的是旧版 HSK 等级标准, 除非有明确说明。在研究的词典中, 有 8 部 (16%) 提供了旧版 HSK 的等级信息。因此, 与其他功能相比, 提供这方面信息的词典数量仍然相对较少。其中包括 MDBG Chinese Dictionary、Arch Chinese 和 OMG Chinese (见图 6)。

Simplified Pinyin	English Definition	Traditional HSK
好 hǎo	good / appropriate; proper / all right! / (before a verb) easy to / (before a verb) good to / (before an adjective for exclamatory effect) so / (verb complement indicating completion) / (of two people) close; on intimate terms / (after a personal pronoun) hello	HSK 1
好 hào	to be fond of; to have a tendency to; to be prone to	HSK 4
孬 nāo	(dialect) no good (contraction of 不好)	

图 6 MDBG Chinese Dictionary 中关于“好”字不同含义对应的旧版 HSK 级别

9) 翻译能力

数字词典也能帮助学生发展翻译能力。在学习翻译过程中，使用一本质量高的参考词典至关重要，特别是对于成语、谚语或正式文本的翻译。根据分析，有 41 部词典（80%）为用户提供了翻译功能。其中，Diccionario chino-español、《在线汉语词典》和《有道词典》尤为突出。这些词典提供的释义和不同语境下的词汇使用示例可以帮助学生掌握词语的用法，并将这种能力应用于翻译。此外，翻译功能和提供的示例为学生在翻译过程中提供了参考，减少了词汇使用不当的情况。

10) 文化能力

文化学习是任何语言学习过程中不可或缺的一部分，因此，笔者认为学生在查阅词典时能够补充一些中国文化知识也是非常有意义的。中国历史已有五千年的悠久传承，数字词典不可能涵盖所有的中国文化，但一些被调查的词典尝试将汉字、词汇与文化元素联系起来，并详细描述了这种关联。在调查的 51 部词典中，只有 11 部（22%）包含了中国文化的相关部分，通常可以找到关于地域变体、词汇的历史来源、传统和谚语等信息。在某些情况下，部分词典仅简要提及特定的文化方面，而另外一些词典则提供了大量有趣的信息。例如，《国学大师》和 Yellow Bridge 的文化板块内容丰富多彩，相较其他词典，它们提供了更多的文化内容，因此更适合对中国文化感兴趣的学生所使用。在 YellowBridge 中，有一个专门用于学习中国文化的部分，包括中国节日、风水计算器、易经、中国笑话和经典文学作品等（见图 7）。可以看到，除了传统文化之外，该部分还涉及一些在日常中文学习中很少接触到的文化内容，如中国的占卜学，这在中文课堂中几乎不会涉及。对这些文化内容感兴趣的用户可以利用这个词典来激发他们对中国文化的兴趣，从而促进语言学习与文化知识的结合。



图 7 Yellow Bridge 中的文化板块

11) 用户概况及易用性

在这一部分，笔者重点探讨这些数字词典是否适合各个中文水平的学生。正如之前提到的，有些词典由于其难度较高或专业性强，不适合初学者使用。笔者共识别出 32 部（63%）适用于任何中文水平学生的词典。事实上，这些词典都有英文版网页，其中 28 部仅使用英语作为主要语言，一部是中英双语词典，另一部则是多语言词典。这些数据表明，编纂者普遍将英语视为通用语言，认为其是最合适的媒介语选择。

关于词典的易用性，此研究分析了以下几个方面：搜索方式、广告的插入、信息的布局、多模态（即除了文字之外，是否提供歌曲、图片或视频等其他形式的内容），最后，基于以上所有信息，进行了对词典的使用便捷性的评估。

通常，所有词典都具备搜索功能。除了通过输入汉字和词汇进行直接搜索外，一些词典还提供了其他搜索选项。在研究分析的 51 部词典中，有 29 部（57%）提供了除汉字、英语或其他语言之外的搜索方式。一些词典试图适应用户的不同使用习惯，从而提升了其适应性和可用性。例如，《異體字字典》、《国学大师》和《康熙字典》为用户提供了五种以上的搜索方法，除了拼音外，还包括基于不同转写系统的输入法（见图 8）或汉字字形的检索方式（见图 9）。

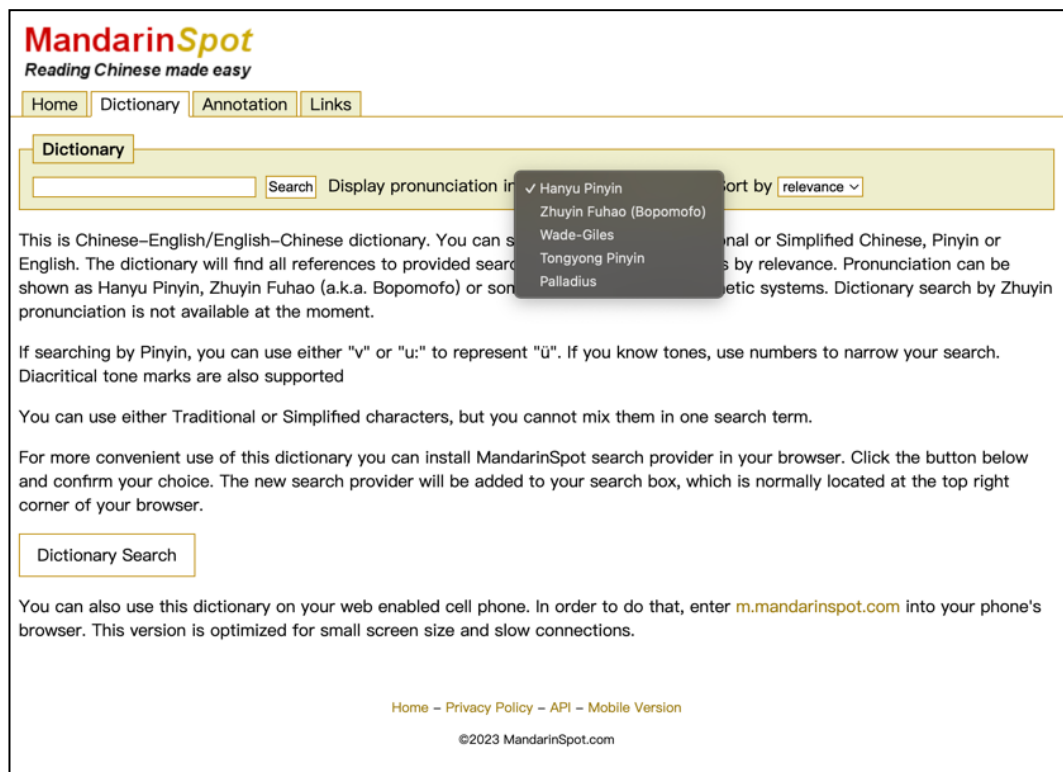


图 8 按 Mandarin Spot 提供的基于不同转写系统的输入法类型



图 9 Yellow Bridge 提供的搜索方法

信息的分布无疑会影响用户体验。一些词典将所有功能清晰地呈现在同一页面上，方便用户快速找到所需信息。在分析的 51 个资源中，有 46 个（90%）的信息布局非常合理，使用户能够直观地看到每个部分对应的具体信息类型。

在分析过程中，笔者发现一些词典在词汇解释中添加了图片，甚至还有专门的板块包含音乐或视频等补充文化内容。在 11 个案例中（22%），词典提供了此类材料。图片的结合可以帮助学生更好地记住汉字。例如，中文中有许多象形文字，如“马”。如果词典在解释该字的起源和含义后附上一匹马的图片，学生可能会更加生动地记住这个汉字（见图 10）。



图 10 《现代汉语词典》中“马”词条配图

词典为用户提供了多种功能，其中一些旨在帮助用户自主学习、按照自己的节奏进行学习。基于这一点，研究分析了以下三个方面：是否可以创建个性化单词列表、用户是否能够在资源平台上与他人互动，以及是否具备自我评估功能。这些特点是数字词典相较于纸质词典的明显优势。

样本中的 29%（15 部）词典提供了将词汇组织成用户自定义列表的功能，这为用户使用词典提供了更多的灵活性。例如，当用户遇到不熟悉的词汇时，可以将其添加到自己的单词列表中，之后有针对性地进行复习。此功能还提高了查找词汇的效率，用户可以直接查看自己保存的词汇列表，节省时间。Trainchinese 和 OMG Chinese 不仅允许用户创建自己的单词列表，还提供了将用户自定义词汇添加到词典现有列表中的选项。

一些词典还为用户提供了互动平台。在所研究的 51 部词典中，有六部（12%）具备此功能。当学生遇到疑问时，通常会向老师或同学请教。然而，对于那些自学的学习者而言，拥有这样的平台以便与其他用户交流信息可能极具价值（见图 11）。学生可以在 HanYou、《中國哲學書電子化計劃》和《汉典》中找到类似的咨询和讨论板块。

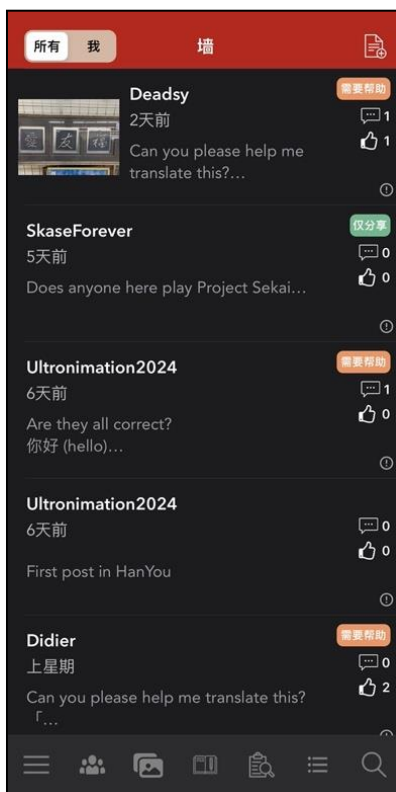


图 11 HanYou 中的讨论论坛

一些词典提供了自我评估的功能，以使用户复习和深化所学内容（见图 12）。在 51 部词典中，有 16 部（31%）允许用户进行自我评估。其中，六部通过闪卡进

行自我评估，这似乎是最常见的机制之一。通过定期的自我评估，用户可以识别自己已经掌握的内容以及弱点，从而优化学习时间，避免浪费在已经掌握的内容上。在这一方面，笔者推荐 HanYou – Chinese Dictionary and OCR、SmartHanzi 和《西语助手》。

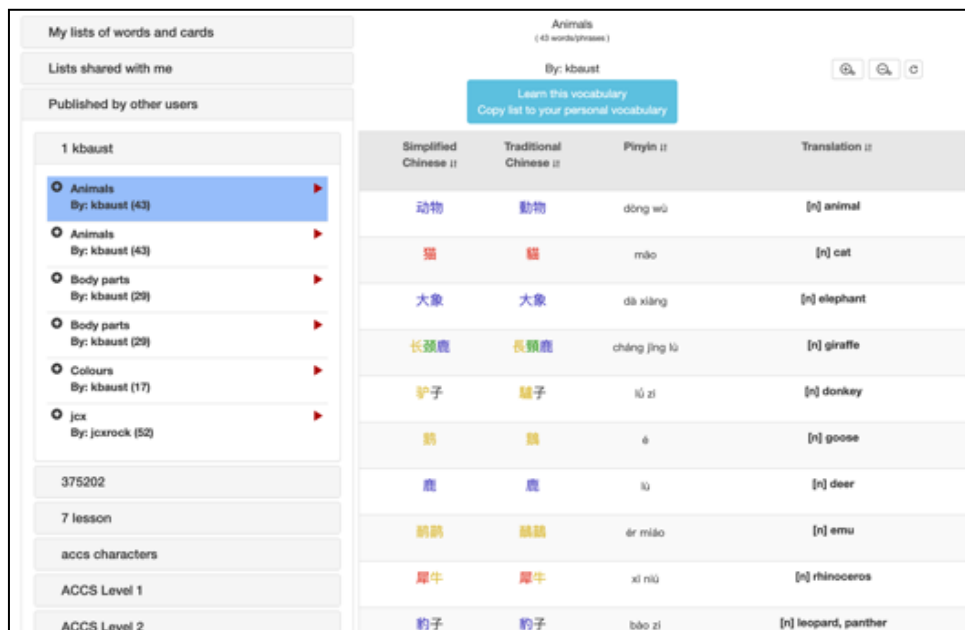


图 12 《懂中文》词汇列表创建功能

最后，除了上述提到的数字词典所提供的常见功能外，笔者还发现有 18 部（35%）词典提供了文本翻译功能。可以看出，许多词典认为用户可能在理解长难句或段落时遇到困难，因此增加了此功能从而得以帮助用户更好地理解文本。用户不仅可以此功能来进行文本的翻译，还可以检查自己翻译的准确性，从而识别可能的词汇或语法错误。在提供更为精确翻译结果的词典中，笔者发现了《文言文翻译官》、《西语助手》和《有道词典》。

笔者通过考虑广告的存在、信息的分布以及附带图片、视频和歌曲的可用性等分析参数，评估了数字词典的易用性。为方便比较分析结果，研究采用了李克特量表来评估这一方面，其中 5 分表示词典非常易用，1 分表示词典的可用性较低。在 51 部词典中，21 部（41%）获得了 5 分，16 部（31%）获得了 4 分，7 部（14%）获得了 3 分，2 部（8%）获得了 2 分，最后有 3 个资源（6%）仅获得 1 分（见图 13）。总体而言，大多数词典都被认为易于使用，这与数字词典相较于传统纸质词典的主要特征一致，即提供了快捷方便的信息访问。在关于可用性的分析中，《魚》、Arch Chinese 和《萌典》表现突出。这些词典的特点是界面简洁，所有功能在主页上都清晰标示（见图 14-16）。

使用难易程度 (1-5, 1:简单, 5:困难)	词典名称	词典类型
5	Arch Chinese	网络词典
5	CantoTranslate	插件
5	Chinese words separator: Chinese dictionary	插件
5	DianHua Dictionary	应用程序
5	HanziCraft	网络词典
5	KTdict C-E	应用程序
5	LiuChan Chinese Popup Dictionary	插件
5	MandarinSpot	网络词典
5	OMGChinese	网络词典
5	PONS在线词典	网络词典
5	笔顺网	网络词典
5	懂中文	网络词典
5	汉字笔画查询	网络词典
5	海词词典	网络词典
5	金山词霸	网络词典
5	萌典	网络词典
5	文言文字典 - 简单易用的文言文词典	应用程序
5	现代汉语词典	应用程序
5	有道词典	网络词典/应用程序
5	鱼	应用程序
5	在线汉语字典	应用程序
4	Cantonese-English pop-up dictionary for Chrome	插件
4	Diccionario chino-español	网络词典
4	MDBG Chinese Dictionary	网络词典
4	Skritter	应用程序
4	Syng	应用程序
4	trinchinese	网络词典
4	YellowBridge	网络词典
4	Zhongwen: A Chinese Popup Dictionary for Chrome	插件
4	成语词典 - 汉语学习必备工具书	应用程序
4	古代汉语词典 - 古诗词文言文必备工具书	应用程序
4	汉典	网络词典
4	划词翻译	插件
4	康熙字典網上版	网络词典
4	文言文翻译官 - 古文文言文翻译古汉语字典	应用程序
4	西语助手	应用程序
4	造句网	网络词典
3	Chinese Tools (extensión)	插件
3	HanYou - Chinese Dictionary and OCR	应用程序
3	Hanyu Da Cidian (汉辞网)	网络词典
3	Line Dict Chinese-English	网络词典
3	Yahoo奇摩字典搜尋	网络词典
3	文林	网络词典
3	小马词典	网络词典
2	SmartHanzi	应用程序
2	国学大师	网络词典
2	句酷	网络词典
2	中國哲學書電子化計劃	网络词典
1	A Dictionary of Chinese Buddhist Terms	网络词典
1	異體字字典	网络词典
1	中文.com	网络词典

图 13 样本中 51 部词典的可用性

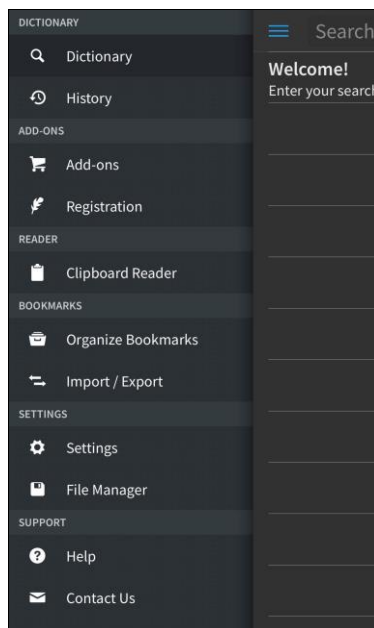


图 14 魚的搜索界面

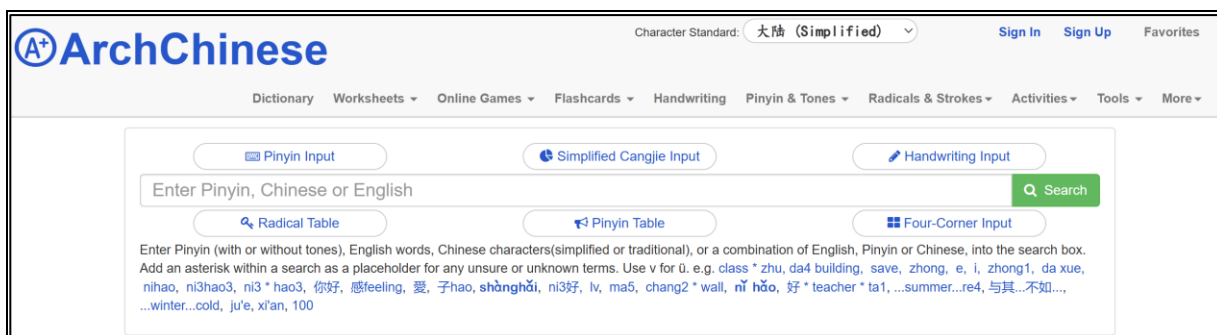


图 15 Arch Chinese 的搜索界面



图 16 萌典的搜索界面

如图 13 所示, 在评分最高的 21 个资源 (5/5 分) 中, 笔者发现包括网页 (61.90%)、手机应用程序 (28.57%) 和插件 (14.28%)。也就是说, 资源的格式似乎并未直接影响其质量, 尽管在评分较低的范围, 网页格式的词典占有更高的比例。

4. 结论

随着科技的进步, 关于数字词典的设计也在不断演变与提升。专家们为此类工具开发了多种功能, 超越了仅仅查阅词义的范畴, 为用户提供了补充性工具。然而, 这些工具并不总是得到充分重视或利用。因此, 本研究的主要目标是提供关于数字词典功能的全景视角, 探索除了传统功能之外, 这些词典还能如何促进学生的学习以及对外汉语教学的各种能力发展。作为次要目标, 笔者旨在根据学生的不同需求和学习特点, 推荐最合适的资源。

基于从 e-Chinese Tools 导出的 51 部词典列表, 笔者建立了一个数据库, 记录了对 30 多个参数的分析结果, 涵盖了形式和内容的众多方面。此方法使研究得以进行混合分析。一方面, 量化数据能够帮助通过具有代表性的样本展示现状, 另一方面, 通过定性分析, 笔者能够在每个研究的方面选择出 2-3 个最佳资源 (见附录 3)。这些结果不仅帮助读者了解现有资源的概况, 还基于客观的评价标准, 为资源的使用开辟了新的视角。针对每项功能选择的三大顶级资源, 也是研究的一个重要贡献, 尤其在一个用户越来越期望即时性和个性化的世界中, 这一贡献尤为重要。

在分析了众多具有不同特征的资源并考虑其提供的各种功能后, 笔者认为, 最适合中文学习初学者用来发展基本语言能力的词典是《魚》、《懂中文》、Arch Chinese、MandarinSpot、OMG Chinese、和YellowBridge。这些词典中, 除《魚》为手机应用程序外, 其他均为网页格式, 并在易用性方面表现一致。这些词典所提供的功能都可以满足汉语初学者培养听、说、读、写的语言技能。然而, 每部词典都有其独特的设计, 有着独具特色的优势, 例如, 《魚》作为一款典型的中文学习应用程序, 有着齐全的汉语学习功能, 包括抽认卡 (flashcards)、汉字手写识别、发音、翻译、笔画动画等。并且, 对付费用户, 《魚》还提供了额外的功能, 例如, 为用户提供大量中文书籍, 如巴金的《家》、《春》、《秋》以及四大名著等, 并按旧版HSK水平分类提供阅读材料。《懂中文》为每个词典中的例句配备了相应的图片和链接到相关的YouTube视频, 解决了学生对学习中文时没有相关视频可供参考的难题。OMG Chinese 同样为用户提供了相关视频, 并且在词典内, 所有视频都有中英文字幕以及拼音, 更加适合初学者逐字逐句地进行学习。Arch Chinese 除中英文外, 还提供了五种不同的搜索方式, 包括拼音、仓颉、手写、四角及部首, 用户可以根据自己对汉字的掌握程度自行选择合适的输入法。并且, 词典为用户准备了每个汉字的田字格练习, 对于正在学习汉字书写的学生而言有极大帮助。MandarinSpot 则为用户提供了文本翻译的选项, 在进行翻译的同时, 它还提供所翻译汉语文本的拼音。YellowBridge中文化板块的内容是本次分析中51个数字词典都

未涉及到的，多元的汉语文化让学生更深入的了解中国文学，加大对汉语学习的动力。

总而言之，面对当前众多可供选择的数字词典，笔者进行了细致的研究与筛选，旨在帮助用户作出最佳选择。此研究的最大贡献在于提供了一个开放访问的数据库以及基于30多个分析参数的研究方法。然而，本研究也存在一定的局限性。一方面，样本有限且资源在不断变化，因此无法涵盖所有现有的数字词典。此外，任何分析都包含一定的主观成分，其他用户，尤其在涉及易用性时，可能会得出不同的结论。

正如目前数字词典在市面上的数量正在增长，人工智能也正在参与到语言教学的过程中。与数字词典相比，人工智能有着自己的优劣。笔者认为，电子词典具有更高的准确性，相比人工智能生成的答案，传统词典中囊括的专业知识有着更高的权威性，所有信息都是经过特定领域的专家编撰并核实的，而人工智能所提供的信息往往未经过仔细核验。并且，上述部分数字词典中提供给用户的信息具有一定的关联性，例如用户通过搜索汉字可以得到与其相关的单词、例句或文化背景等，而人工智能的搜索并不具备这种关联性。因此，本文将重点放在如何帮助正在进行汉语学习的学生选择适合他们的词典上。笔者认为，人工智能可以帮助人们更好地进行数字词典的编撰与优化，适当地在语言学习与教学的过程中使用人工智能，可以实现与数字词典相辅相成的效果。笔者希望通过这项研究，学生能够更好地利用现有资源，提高汉语学习的效率，并根据自己的需求选择最合适的词典。最后，笔者也希望此研究能成为教师的有力工具，帮助他们根据学生的不同特点或需求推荐合适的资源，同时为词典编纂者和开发者提供参考建议，以改进此类参考工具中的一些现有功能。

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附录 1 研究所涉 51 部词典的数据库概览
(详细信息和具体数据请点击[这里](#)下载 Excel 文档)

词典编号	词典名称	单语词典 / 双语词典 / 多语词典	词典类型
1	A Dictionary of Chinese Buddhist Terms	双语词典	网络词典
2	Arch Chinese	双语词典	网络词典
3	Cantonese-English pop-up dictionary for Chrome	双语词典	插件
4	CantoTranslate	双语词典	插件
5	Chinese Text Project	双语词典	网络词典
6	Chinese Tools (extensión)	双语词典	插件
7	Chinese words separator: Chinese dictionary	双语词典	插件
8	DianHua Dictionary	双语词典	应用程序
9	Diccionario chino-español	多语词典	网络词典
10	HanYou – Chinese Dictionary and OCR	单语词典	应用程序
11	HanziCraft	双语词典	网络词典
12	KTdict C-E	多语词典	应用程序
13	Line Dict Chinese-English	双语词典	插件
14	LiuChan Chinese Popup Dictionary	双语词典	插件
15	MandarinSpot	双语词典	网络词典
16	MDBG Chinese Dictionary	双语词典	网络词典
17	OMGChinese	双语词典	网络词典
18	PONS 在线词典	多语词典	网络词典
19	Skritter	双语词典	应用程序
20	SmartHanzi	双语词典	应用程序
21	Syng	双语词典	应用程序
22	trainchinese	多语词典	网络词典
23	Yahoo 奇摩字典搜寻	单语词典	网络词典

24	YellowBridge	双语词典	网络词典
25	Zhongwen: A Chinese Popup Dictionary for Chrome	双语词典	插件
26	笔顺网	双语词典	网络词典
27	成语词典 - 汉语学习必备工具书	单语词典	应用程序
28	懂中文	双语词典	网络词典
29	古代汉语词典	单语词典	应用程序
30	国学大师	单语词典	网络词典
31	海词词典	单语词典	网络词典
32	汉辞网	单语词典	网络词典
33	汉典	单语词典	网络词典
34	汉字笔画查询	单语词典	网络词典
35	划词翻译	单语词典	插件
36	金山词霸	单语词典	网络词典
37	句酷	单语词典	网络词典
38	康熙字典网上版	单语词典	网络词典
39	萌典	单语词典	网络词典
40	文林	双语词典	网络词典
41	文言文翻译官 - 古文言文翻译古汉语字典	单语词典	应用程序
42	文言文字典 - 简单易用的文言文词典	单语词典	应用程序
43	西语助手	双语词典	应用程序
44	现代汉语词典	单语词典	应用程序
45	小马词典	双语词典	网络词典
46	异体字字典	双语词典	网络词典
47	有道词典	单语词典	网络词典 / 应用程序
48	魚	双语词典	应用程序
49	在线汉语词典	单语词典	网络词典
50	造句网	单语词典	网络词典
51	中文.com	双语词典	网络词典

附录 2 作为研究语料库一部分的数字词典

词典编号	词典名称	词典链接
1	A Dictionary of Chinese Buddhist Terms	https://mahajana.net/texts/soothill-hodous.html
2	Arch Chinese	https://www.archchinese.com/
3	Cantonese-English pop-up dictionary	https://chrome.google.com/webstore/detail/cantonese-popup-dictionar/pjnbhojkojmibobcpfgihhnohboldhip?hl=ca

	for Chrome	
4	CantoTranslate	https://chromewebstore.google.com/detail/cantotranslate/idagpklnbkefmgdajpopkngfnnjiidj
5	Chinese Tools (extensión)	https://chrome.google.com/webstore/detail/chinese-tools/aicnjppelckphnaiohdpicomfaedhnfk?hl=ca
6	Chinese words separator: Chinese dictionary	https://chromewebstore.google.com/detail/chinese-words-separator-c/gacfacdpfimbkgcnlegknnmccccjgcbnp
7	DianHua Dictionary	https://apps.apple.com/es/app/dianhua-dictionary/id288580473?platform=ipad
8	Diccionario chino-español	https://www.chino-china.com/diccionario
9	HanYou – Chinese Dictionary and OCR	https://play.google.com/store/apps/details?id=com.yomiwa.hanyou&hl=ca&gl=US
10	HanziCraft	https://hanzicraft.com/
11	Jukuu 句酷	网页无法打开
12	KTdict C-E	https://apps.apple.com/es/app/ktdict-c-e/id291179703
13	Line Dict Chinese-English	https://dict.naver.com/linedict/zhendict/dict.html#/cnen/home
14	LiuChan Chinese Popup Dictionary	https://chromewebstore.google.com/detail/liuchan-chinese-popup-dic/hjppjmkjmkgedphipmbnmejlfnfdjcgdf
15	MandarinSpot	https://mandarinspot.com/
16	MDBG Chinese Dictionary	https://www.mdbg.net/chinese/dictionary
17	OMGChinese	https://www.omgchinese.com/
18	PONS 在线词典	https://es.pons.com/traducci%C3%B3n/esp%C3%B1ol-chino/diccionario+esp%C3%B1ol+chino
19	Skritter	https://skritter.com/
20	SmartHanzi	https://www.smarthanzi.net/en/index.php
21	Syng	https://www.getsyng.com/
22	trainchinese	https://www.trainchinese.com/
23	Yahoo 奇摩字典 搜尋	https://tw.dictionary.search.yahoo.com/
24	YellowBridge	https://www.yellowbridge.com/
25	Zhongwen: A Chinese Popup Dictionary for Chrome	https://zhongwen-chrome.blogspot.com/
26	成语词典 - 汉语学习必备工具书	https://apps.apple.com/cn/app/%E6%88%90%E8%AF%AD%E8%AF%8D%E5%85%B8-%E6%B1%89%E8%AF%AD%E5%AD%A6%E4%B9%A0%E5%BF%85%E5%A4%87%E5%B7%A5%E5%85%B7%E4%B9%A6/id877452772
27	懂中文	https://www.dong-chinese.com/
28	古代汉语词典 - 古诗词文言文必备工具书	https://apps.apple.com/cn/app/%E5%8F%A4%E4%BB%A3%E6%B1%89%E8%AF%AD%E8%AF%8D%E5%85%B8-%E5%8F%A4%E8%AF%97%E8%AF%8D%E6%96%87%E8%A

		8%80%E6%96%87%E5%BF%85%E5%A4%87%E5%B7%A5%E5%85%B7%E4%B9%A6/id1036139994
29	国学大师	http://www.guoxuedashi.net/
30	海词词典	http://dict.cn/
31	汉辞网	https://www.hydcn.net/
32	汉典	https://www.zdic.net/
33	汉字笔画查询	http://www.strokeorder.info/
34	汉字笔画查询	https://bihua.bmcx.com
35	划词翻译	https://chrome.google.com/webstore/detail/%E5%88%92%E8%AF%8D%E7%BF%BB%E8%AF%91/ikhdkkcnoglhjlkmcimlnlhkeamad?hl=ca
36	金山词霸	http://www.iciba.com/
37	康熙字典網上版	https://kangxizidian.com/
38	萌典	https://www.moedict.tw/ 萌
39	文林	http://www.wenlin.com/
40	文言文翻译官 - 古文言文翻译古汉语字典	https://apps.apple.com/cn/app/%E6%96%87%E8%A8%80%E6%96%87%E7%BF%BB%E8%AF%91%E5%AE%98-%E5%8F%A4%E6%96%87%E8%A8%80%E6%96%87%E7%BF%BB%E8%AF%91%E5%8F%A4%E6%B1%89%E8%AF%AD%E5%AD%97%E5%85%B8/id1525650414
41	文言文字典 - 简单易用的文言文词典	https://apps.apple.com/cn/app/%E6%96%87%E8%A8%80%E6%96%87%E5%AD%97%E5%85%B8-%E7%AE%80%E5%8D%95%E6%98%93%E7%94%A8%E7%9A%84%E6%96%87%E8%A8%80%E6%96%87%E8%AF%8D%E5%85%B8/id1331325570
42	西语助手	http://www.esdict.cn/
43	现代汉语词典	https://apps.apple.com/cn/app/现代汉语词典-一部久享盛誉的规范性词典/id1330896529
44	小马词典	http://www.xiaoma.info/
45	異體字字典	https://dict.variants.moe.edu.tw/
46	有道词典	https://www.youdao.com/
47	魚	https://www.pleco.com/
48	在线汉语词典	http://xh.5156edu.com/
49	造句网	https://zaojv.com/
50	中國哲學書電子化計劃	https://ctext.org/
51	中文.com	http://zhongwen.com/

附录 3 在所分析的各方面最值得推荐的数字词典及其使用链接

	Top 1	Top 2	Top 3
语音能力	Trainchinese https://www.trainchinese.com/	魚 https://www.pleco.com/	Arch Chinese https://www.archchinese.com/

书面表达能力	中國哲學書電子化計劃 https://ctext.org/	造句网 https://zaojv.com/	-
字形能力	汉典 https://www.zdic.net/	懂中文 https://www.dong-chinese.com/	異體字字典 https://dict.variants.moe.edu.tw/
笔画动画	汉典 https://www.zdic.net/	懂中文 https://www.dong-chinese.com/	HanYou https://play.google.com/store/apps/details?id=com.yomiwa.hanyou&hl=ca&gl=US
词源信息	康熙字典 https://kangxizidian.com/	Yellow Bridge https://www.yellowbridge.com/	汉典 https://www.zdic.net/
偏旁部首信息	Arch Chinese https://www.archchinese.com/	異體字字典 https://dict.variants.moe.edu.tw/	懂中文 https://www.dong-chinese.com/
汉字的形态词汇信息	MandarinSpot https://mandarinspot.com/	OMG Chinese https://www.omgchinese.com/	Trainchinese https://www.trainchinese.com/
词语的形态句法信息	MandarinSpot https://mandarinspot.com/	OMG Chinese https://www.omgchinese.com/	Trainchinese https://www.trainchinese.com/
HS	MDBG Chinese Dictionary	Arch	OMG Chinese

等级信息	https://www.mdbg.net/chinese/dictionary	Chinese https://www.archchinese.com/	https://www.omgchinese.com/
近反义词	海词词典 http://dict.cn/	萌典 https://www.moedict.tw/萌	OMG Chinese https://www.omgchinese.com/
翻译能力	Diccionario chino-español https://www.chino-china.com/diccionario	在线汉语词典 http://xh.5156edu.com/	Youdao https://www.youdao.com/
文化能力	国学大师 http://www.guoxuedashi.net/	Yellow Bridge https://www.yellowbridge.com/	-
自我评估	HanYou – Chinese Dictionary and OCR https://play.google.com/store/apps/details?id=com.yomiwa.hanyou&hl=ca&gl=US	SmartHanzi https://www.smarthanzi.net/en/index.php	西语助手 http://www.esdict.cn/
创建单词表的功能	Trainchinese https://www.trainchinese.com/	OMG Chinese https://www.omgchinese.com/	-
使用难易度	Arch Chinese https://www.archchinese.com/	Dianhua Dictionary https://apps.apple.com/es/app/dianhua-dictionary/id288580473?platform=ipad	PONS 在线词典 https://es.pons.com/traducci%C3%B3n/esp%C3%B1ol-chino/diccionario+esp%C3%B1ol+chino
搜索方式	異體字字典 https://dict.variants.moe.edu.tw/	国学大师 http://www.guoxuedashi.net/	康熙字典 https://kangxizidian.com/

在句子语境中包含示例	魚 https://www.pleco.com/	OMG Chinese https://www.omgchinese.com/	trainchinese https://www.trainchinese.com/
包含图片、视频或歌曲	懂中文 https://www.dong-chinese.com/	OMG Chinese https://www.omgchinese.com/	成语词典 https://apps.apple.com/cn/app/%E6%88%90%E8%AF%AD%E8%AF%8D%E5%85%B8%E6%B1%89%E8%AF%AD%E5%AD%A6%E4%B9%A0%E5%BF%85%E5%A4%87%E5%B7%A5%E5%85%B7%E4%B9%A6/id877452772
提供用户之间的交流平台	HanYou – Chinese Dictionary and OCR https://play.google.com/store/apps/details?id=com.yomiwa.hanyou&hl=ca&gl=US	中國哲學書電子化計劃 https://ctext.org/	汉典 https://www.zdic.net/
文本翻译	文言文翻译官 https://apps.apple.com/cn/app/%E6%96%87%E8%A8%80%E6%96%87%E7%BF%BB%E8%AF%91%E5%AE%98%E5%8F%A4%E6%96%87%E8%A8%80%E6%96%87%E7%BF%BB%E8%AF%91%E5%8F%A4%E6%B1%89%E8%AF%AD%E5%AD%97%E5%85%B8/id1525650414	西语助手 http://www.esdict.cn/	有道词典 https://www.youdao.com/

Review of
A Hybrid Approach to Teaching Chinese Through Digital Humanities, CALL, and Project-Based Learning
(《*A Hybrid Approach to Teaching Chinese Through Digital Humanities, CALL, and Project-Based Learning*》书评)

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This review examines *A Hybrid Approach to Teaching Chinese through Digital Humanities, CALL, and Project-Based Learning* by Dongdong Chen. The book presents an innovative pedagogical framework called DATEPBLL, integrating Digital Humanities (DH), Computer-Assisted Language Learning (CALL), and Project-Based Language Learning (PBLL) to enhance teaching Chinese as a foreign language (TCFL). Chen provides theoretical insights and practical applications, demonstrating the synergies of these methodologies through case studies and best practices.

1. Overview of the Book and Chapter Summaries

The book is systematically organized into seven chapters, each delving into a crucial component of the DATEPBLL framework. Chen meticulously explores the theoretical underpinnings of CALL, DH, and PBLL, their historical evolution, and their individual and combined potential for enhancing TCFL. Through case studies such as game development, podcast creation, and e-portfolio projects, the author demonstrates the practical applications of the framework, making the book a rich resource for educators and curriculum designers. Additionally, some specific best strategies for teaching Chinese in K-16 settings, highlighted in the book, provide further support for the proposed new approach.

In Chapter 1, the book's introduction, Chen (2024) provides an overview of the topics, i.e., CALL, DH, and PBLL, the first two originating from computing technology. The author outlines learning theory and theoretical accounts of second language acquisition, with a detailed description of the characteristics of learners and instructors in the digital age, and teaching pedagogy. All these pave the way for further exploration of CALL and DH in the context of teaching Chinese as a foreign language (TCFL). In doing

so, the author establishes the rationale behind integrating CALL, DH, and PBL in TCFL and introduces the DATEPBL approach.

Chapter 2, *Computer-Assisted Language Learning (CALL)* explores its evolution, benefits, and challenges, with a focus on its role in enhancing language instruction. Drawing on the findings of Kalyanov (2024), the research emphasizes that CALL plays a transformative role in language education. The study highlights that the effective development of CALL software requires the integration of the four language competencies—reading, writing, listening, and speaking—while also addressing the needs and compatibility of both learners and educators. This ensures that the tools not only meet the individual needs of learners but also align with teaching methodologies. For Russian language educators, such as Kalyanov (2024), CALL offers a unique opportunity to bridge traditional and innovative teaching methods, fostering engaging and interactive environments that enhance language acquisition, which Chen (2024) also highlights in Chapter 2. Both Chen (2024) and Kalyanov (2024), as active CALL researchers and foreign language educators, believe that by tailoring software to these competencies and fits, CALL is a powerful complement to conventional instruction, reinforcing fluency and comprehension in diverse learning settings.

Chapter 3, *Digital Humanities (DH)*, delves into DH's pedagogical potential and historical development, emphasizing the *transformative impact* of Digital Pedagogy on teaching and research in the humanities. As Davis et al. (2020) argue, this impact is grounded in six key concepts that redefine learning in digital pedagogy. First, *openness* fosters transparency of practice, dismantles boundaries, and encourages sharing content, tools, and ideas, enabling a more inclusive and accessible educational environment. Second, *collaboration* reimagines the learning process as a communal effort, with students working together on joint projects that promote teamwork and collective problem-solving. Third, *play* invites experimentation and creativity, encouraging students to try new approaches without fear of failure. Fourth, *practice* emphasizes applied learning through assignments, creation, and making, bridging theory and action in meaningful ways. Fifth, *agency* empowers students to take ownership of their learning, fostering a sense of control and efficacy as they apply their skills in diverse contexts. Lastly, *identity* highlights the role of digital environments in allowing students to explore and express their individuality, supporting their self-development, and preserving their personal and cultural identities. Together, these principles underscore the transformative potential of DH in reshaping educational experiences and equipping learners with skills essential for the 21st century.

Chapter 4, *Project-Based Language Learning (PBL)*, details the transition from traditional Project-Based Learning to PBL and underscores its relevance for modern language education. The chapter proposes integrating CALL and DH through PBL to form the DATEPBL model (Digital Humanities–Augmented Technology–Enhanced Project-Based Language Learning). This innovative language-teaching approach, suggested by Chen (2024), combines technology, digital humanities tools, and project-based learning to create an interactive and engaging language-learning experience. Students use technology, such as apps and software, alongside digital tools like archives or databases with innovative pedagogy lent by DH to work on meaningful, real-world projects.

These projects not only help learners improve their language skills but also foster cultural understanding, teamwork, and problem-solving abilities. By integrating DH, CALL, and PBL, DATEPBL offers a hands-on approach to language education, making it both practical and innovative. For example, students might create a podcast, design a game to teach vocabulary, or develop an online portfolio showcasing their progress. As a language educator and CALL researcher, I firmly believe this approach is highly effective for teaching Chinese, Russian, or any other foreign language. It seamlessly integrates technology, cultural exploration, and active learning, equipping students with the skills needed for both linguistic proficiency and real-world success.

Chapter 5, *Case Studies*, showcases practical applications of the DATEPBL approach through projects like game development, podcast creation, and e-portfolios, all aligned with the project framework. Chen (2024) offers a thorough rationale for each project, outlining their design, planning, and execution to enhance student learning effectively. The chapter's clear structure and detailed guidance make it easy for language educators to adapt these innovative, student-centered projects to other language programs, promoting impactful and engaging instruction.

In Chapter 6, *Best Practices*, Chen (2024) highlights innovative PBL strategies for teaching Chinese in both K-12 and university settings. For K-12 classrooms, the author emphasizes the importance of real-world applications to make language learning relevant and engaging. Collaborative work is encouraged to build both language and social skills, while creative projects like calligraphy using unconventional materials inspire creativity alongside language practice.

In university contexts, Chen (2024) focuses on integrating cultural elements and technology to deepen learning. Music and culture-focused activities allow students to explore traditional and modern Chinese culture, enriching their understanding of the language. The third project on website development integrates digital skills with language learning by engaging students in applying their classroom knowledge to create a website designed for prospective university students. This approach combines linguistic and digital competencies, fostering the development of both skill sets through the creation of a functional and resourceful platform.

Chen (2024) concludes with general recommendations for effective PBL implementation. Key strategies include scaffolded support to guide students toward autonomy, the integration of technology to enhance linguistic and cultural learning, and an interdisciplinary approach to address diverse learner needs. Projects should be outcome-oriented, aligning with clear objectives such as linguistic competency, cultural awareness, and the development of 21st-century skills. The adaptability of PBL makes it a versatile method for advancing Chinese language education across educational levels.

Chapter 7, *Future Directions*, examines emerging technologies like generative AI and their implications for the DATEPBL approach, offering recommendations for future applications. As an active CALL researcher, based on the findings of my study on CALL (Kalyanov, 2024), it is crucial to have a model like DATEPBL, where technology

integrates with pedagogy to enhance PBL. This is especially important in the times of AI and rapidly evolving generative AI technologies. However, no matter how sophisticated these technologies grow, pedagogy remains the cornerstone of effective learning.

2. Innovation and Applications

Chen's work is particularly commendable for its practical focus and innovative blend of technology, pedagogy, and collaborative learning. The DATEPBL approach redefines traditional language learning by infusing it with cutting-edge digital tools and project-based frameworks. Unlike conventional methods that prioritize rote memorization and isolated skill drills, DATEPBL emphasizes meaningful, contextualized learning experiences where students actively engage with language authentically and purposefully through student-centered, project-based language learning activities. Chen (2024) exemplifies this model through detailed case studies demonstrating how CALL and DH can complement PBL to create immersive and multifaceted learning experiences.

One of the most striking innovations is the **gaming project**, which illustrates how digital tools can transform rote memorization into dynamic and interactive gameplay. Students are guided to design and implement educational games that reinforce language concepts such as vocabulary and grammar. Students are guided to design and implement educational games that reinforce language learning by building an association between two linguistic components. Like learning any language, when learning Chinese, students must establish a one-to-one association between the pronunciation of a syllable with a correct tone, between a sound with its corresponding meaning, and between a word with its visual image. What is noteworthy is the fact that the end product of this gaming project remains available online and serves the purpose of teaching and learning materials. Additionally, by participating in this creative process, learners not only enhance their language skills but also develop problem-solving abilities, teamwork, and digital literacy.

The **podcast project**, another notable example, emphasizes integrating technology with real-world communication skills. Students create podcasts on culturally rich topics, requiring them to conduct research, script content, and present their work in the target language. This project fosters authentic language use, critical thinking, and an appreciation of Chinese culture. The outcome is a learning experience that is both engaging and deeply rooted in cultural understanding. Based on my teaching experience, this podcast project can be applied to learners of different languages and different proficiency levels in various formats.

The **e-portfolio project**, aimed at preservice teachers, showcases the utility of DH and CALL in professional development. Through the creation of e-portfolios, these future educators document their learning journeys, reflect on their teaching philosophies, and curate resources to use in their careers. This project not only prepares them for practical challenges in the classroom but also equips them with digital competencies essential for modern teaching.

Furthermore, Chen extends the discussion beyond individual classroom practices to address best practices adopted by other Chinese language educators. Examples include collaborative projects such as calligraphy using unconventional materials, student-created websites to explore linguistic topics, and music-infused cultural activities. These innovative applications demonstrate the versatility of the DATEPBL model and its potential for adaptation across diverse educational settings.

Chen also underscores the potential of emerging technologies, such as generative AI, to enhance the DATEPBL approach further. By incorporating AI-driven tools, instructors can personalize learning experiences, generate adaptive content, and provide immediate feedback, making language education more accessible and efficient.

In summary, the innovations and applications presented in this volume highlight Chen's dedication to marrying theory with practice. The DATEPBL approach goes beyond merely integrating technology and pedagogy; it transforms it into a medium through which students are actively making things by constructing knowledge, collaborating meaningfully, and developing skills beyond the classroom. This ensures that the book is not only a theoretical guide but also a practical resource for educators striving to modernize their teaching methodologies.

3. Contributions and Limitations

The book stands out for its innovative interdisciplinary approach, which bridges the gap between language pedagogy and digital innovation. Notably, it introduces the DATEPBL model, which calls for integrating three currently separate disciplines—Digital Humanities, Computer-Assisted Language Learning (CALL), and Project-Based Learning—into a cohesive framework. This model represents a significant contribution to the field by addressing foreign language standards, promoting 21st-century skills such as collaboration, critical thinking, and digital literacy, and accommodating the unique needs of the current generation of students. By synergizing these domains, Chen (2024) not only advances the theoretical frameworks of CALL, DH, and PBL but also enriches them with empirical evidence, actionable insights, and practical applications tailored for modern learners.

As a limitation, although the book targets a broad audience, readers who are not familiar with the specialized terminologies of Computer-Assisted Language Learning (CALL), Digital Humanities (DH), and Project-Based Language Learning (PBL) may find the theoretical sections somewhat challenging. Additionally, while the DATEPBL framework is thoughtfully developed, the book could benefit from a deeper exploration of its scalability and adaptability to non-Chinese language contexts. For language educators who are less experienced with PBL, providing explicit guidance on tailoring the showcased projects to their specific teaching contexts would further enhance their practical value and accessibility.

4. Concluding Remarks and Recommendations

In *A Hybrid Approach to Teaching Chinese through Digital Humanities, CALL, and Project-Based Learning*, Chen (2024) presents a groundbreaking resource for educators and researchers in Teaching Chinese as a Foreign Language (TCFL). The book compellingly illustrates how the integration of DH, CALL, and PBL can elevate both linguistic and cultural competence. While its primary focus is on TCFL, the DATEPBL framework offers transformative insights that extend to diverse educational contexts.

In an era increasingly dominated by artificial intelligence (AI), language educators must rethink traditional teaching paradigms, redefine classroom dynamics, and adapt to the evolving needs of tech-savvy students. By exploring the synergies between DH, CALL, PBL, and emerging AI applications, Chen (2024) encourages educators to embrace innovative methodologies that prepare students for the challenges of a digital and interconnected world. Essential for educators, curriculum designers, and graduate students, this book also serves as a vital resource for administrators and policymakers aiming to harness technology's potential to reshape education.

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用数据铺就汉语教学研究的科学之路
——评《汉语课堂教学结构和过程建模研究》
**Using Data to Drive Chinese Language Teaching Research—
Review of *Research on Chinese Classroom Teaching Structure
and Process Modeling***

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随着信息技术的飞速发展和教育理念的不断更新，汉语教学研究正逐步向科学化、精细化方向迈进。在这一过程中，数据驱动的研究方法逐渐成为探索汉语教学规律、优化教学策略的重要手段。郑艳群教授撰写的《汉语课堂教学结构和过程建模研究》一书，正是在这一背景下应运而生的。该书以大数据和教育技术为支撑，通过对汉语课堂教学结构和过程的系统建模研究，为汉语教学研究铺就了一条新的途径。

1. 出版背景

在全球化背景下，汉语作为国际交流的重要语言之一，其教学与研究日益受到重视。随着大数据时代的到来，数据驱动的研究方法为汉语教学研究提供了新的契机。《汉语课堂教学结构和过程建模研究》将大数据和教育技术引入汉语课堂教学研究，试图通过系统建模的方法揭示汉语教学的内在规律。

该书的研究背景具有鲜明的时代特征。随着信息技术的快速发展为数据驱动的教学研究提供了技术支持，世界汉语教学学会于2022年发布了《国际中文教师专业能力标准》(T/ISCLT001-2022)，其中明确要求教师“了解并关注前沿技术应用于国际中文教育的最新进展，理解教育技术在中文教学中的本质作用，具有将信息技术与中文教学过程深度融合的意识”。在此背景下，《汉语课堂教学结构和过程建模研究》应运而生。它试图推动汉语教学研究的科学化进程，提高汉语教学的质量和效率，并为汉语教学与研究的可持续发展提供理论支撑和实践指导。

2. 内容框架

《汉语课堂教学结构和过程建模研究》全书内容充实，结构清晰。第一章主要介绍了汉语教学建模的意义和基本方法，探讨了大数据时代汉语教学数据挖掘的重要性。从第二章开始，每一章都针对一个具体的汉语技能（如听力、口语、阅读、写作和综合课）进行教学结构和过程的建模研究。这些章节都遵循一个相似的结构：首先，通过运用扎根理论和内容分析法，推导各技能教学的理论模型；其次，以规范教学实录为研究对象，构建应用模型；然后，对理论模型和应用模型进行对比分析；最后，进行史料分析，揭示教学模式的发展规律。

3. 研究方法

《汉语课堂教学结构和过程建模研究》在研究方法上表现出高度的创新性，充分运用了教育数据挖掘和教学计算等现代技术手段，通过对教学系统中丰富的信息进行搜集、整理、分析和利用，从不同的维度和空间描绘了教学系统的构成、特性和运行规则。书中研究集中体现了以下创新点：

第一，集中体现了大数据与教育技术的融合应用。在书中，充分利用大数据和教育技术的优势，对汉语课堂教学结构和过程进行了系统建模研究。通过收集和分析大量的教学实录数据，揭示了汉语课堂教学的内在规律和特点，为汉语教学研究提供了丰富的实证支持。

第二，强调了系统建模与实证研究的结合。书中采用了系统建模与实证研究相结合的方法，对汉语课堂教学的构件、结构和过程进行了全面而深入的剖析。通过理论模型的推导和应用模型的构建，该书验证了理论认知与教学实践的一致性。

第三，注重历时与共时研究的结合。在书中，通过对不同历史时期汉语教学结构和过程观点的梳理和分析，揭示了汉语教学研究的演进路径和发展趋势。这种研究方法有助于建立对汉语教学研究问题的全局意识，深化对汉语教学规律的理解。

第四，采用了多维度、全方位的研究视角。书中不仅关注汉语课堂教学的宏观结构和过程，还深入到微观层面探讨具体的教学构件和策略。这种研究视角有助于全面揭示汉语课堂教学的内在机制，为教学实践提供有针对性的指导。

由以上创新点看出，书中研究不仅克服了传统研究方法的局限性，还提高了研究的科学性和准确性。同时，还注重跨学科合作与融合，将计算机科学、语言学、教育学等多个学科的理论和方法引入到汉语教学研究中，为汉语教学研究的科学化和现代化提供了有力支持。

4. 研究内容

《汉语课堂教学结构和过程建模研究》在研究内容上涵盖了汉语听力、口语、阅读、写作和综合课多个课型的教学结构和过程建模研究。每个课型的研究都包括理论模型推导、应用模型构建、模型对比和史料分析四个部分，形成了完整的研究体系。

理论模型推导部分，该书对已有研究文献中的汉语教学认知进行了系统梳理和归纳，推导出了各课型教学结构和过程的理论模型。如基于对吕必松先生的《汉语和汉语作为第二语言教学》（2007）的梳理，提出了该书研究框架，强调了教学结构和教学过程在汉语教学研究中的重要性。这一过程中，作者建立了“汉语教学·文献样本数据库”，并在“宏观层—中观层—微观层”的整体架构下，对文献中的教学构件、结构和过程信息进行了提取、赋码和形式化表达。这一方法不仅确保了理论模型的系统性，也为后续的应用模型构建和对比分析提供了坚实的基础。

应用模型构建部分，该书基于课堂教学实践特征，构建了各课型教学结构和过程的应用模型。书中选取了北京语言大学青年教师教学基本功大赛获奖作品和世界汉语教学学会网站上的示范课¹作为研究材料，这些教学实录具有可模仿及可推广的特点，能够代表当前汉语课堂教学的较高水平。通过对教学实录的转写、构件辨识、编码及形式化表达等步骤，建立了“汉语教学·实录研究数据库”，并在此基础上完成了应用模型的构建。这一方法确保了应用模型的实证性和可靠性，也为后续的理论与实践模型对比提供了有力的支持。

模型对比部分，对理论模型和应用模型进行了对比分析，揭示了它们之间的共性和差异。这种对比分析有助于深入探讨教学理论与实践之间的关系，为教学创新和教学改进提供思路和方法。同时，通过模型对比还可以发现教学实践中存在的问题和不足，为教学优化提供有针对性的指导。

史料分析部分，从历时和共时两个角度对教学结构和过程观点的形成和发展规律进行了总结和分析。通过对不同历史时期汉语教学结构和过程观点的梳理和对比，揭示了汉语教学研究的演进路径和发展趋势。这种史料分析有助于建立对汉语教学研究问题的全局意识，为未来的研究提供有益的借鉴和参考。

5. 学术影响

与以往经验性描述居多的研究相比，《汉语课堂教学结构和过程建模研究》取得了新的成果，受到了国内外学者的广泛关注。崔永华（2023）教授在为该书撰写的序言中指出：“这项研究为国际中文教育研究开题了一条新的路径。”其学术影响主

¹ https://mooc.chineseplus.net/dist/courseList?label_id=15,16,17,18,19,20,21&roleId=1&lang=cn

要表现在:

首先,该书在研究内容上实现了飞跃。该书始终聚焦于汉语课堂教学这一核心问题,通过建模研究深入探讨了汉语课堂教学的规律和方法。

其次,该书在研究思路实现了创新。该书以教育技术框架为指导,通过教学分析和教学计算等方法,从时间、空间、交互、情感等维度把握了教学系统的复杂性和动态性。同时,该书还注重理论与实践的结合和互动,通过对比分析等方法探讨了教学理论与教学实践之间的关系,为汉语教学中基于数据驱动的方法论提供了有力支持。

再次,该书在研究方法上实现了突破。该书充分运用了教育数据挖掘和教学计算等现代技术手段,通过对教学系统中丰富的信息进行搜集、整理、分析和利用,从不同的维度和空间描绘了教学系统的构成、特性和运行规则。

基于《汉语课堂教学结构和过程建模研究》成系统的内容、和创新的研究思路与方法,相信在未来,该书必将对汉语教学与研究领域产生广泛而深远的影响。通过揭示汉语课堂教学的内在规律和特点,该书将为汉语教师提供科学的教学方法和策略,有助于提高汉语教学的质量和效率。同时,同时,书中提出的多种新颖教学思路与方法,也将为汉语教学的创新与发展带来重要启示。

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