

## Original article

# A qualitative study of game-based international Chinese language learning experiences

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### Abstract:

Based on the Technology Acceptance Model 2 (TAM2) and the Unified Theory of Acceptance and Use of Technology (UTAUT), this study explored the acceptance and experience of using Chinese language learning games among international students, taking Pakistani students as an example, through the qualitative interview method. The study found that learners generally agreed that educational games help Chinese language learning, especially for beginners, but also pointed out the shortcomings of the games in terms of technical implementation, user interface design and personalized learning support. The findings provide empirical support for the design and improvement of Chinese language educational games, which is instructive for international Chinese language education practice, and point out the direction for the development and optimization of future educational games, demonstrating the potential for the application of educational games in international Chinese language education.

## 1. Introduction

With the continued advancement of globalization, the demand for learning Chinese as a second language is growing rapidly, given that Chinese is one of the most widely spoken languages in the world (Gong et al., 2018). Meanwhile, The rise of China's economy and the expansion of its cultural influence have further driven the global demand for Chinese language proficiency (Chen et al., 2022). However, Chinese presents numerous learning challenges for non-native speakers due to its unique language structure, tonal system, and writing system. These challenges include memorizing Chinese characters, understanding grammatical structures, and achieving fluency in spoken communication (Hong & Chen, 2016).

To address these challenges, educators and technology developers have begun exploring innovative teaching methods, with educational games gaining widespread attention as an emerging tool. Digital game-based learning (DGBL) is also known as game-based learning (GBL)(Daniela, 2019; Daniela

& Lytras, 2018). DGBL is the combination of serious learning and interactive entertainment and can be regarded as a new paradigm of education (de Freitas & Liarokapis, 2011; Prensky, 2007). Several studies have provided measurable evidence that DGBL can improve learning outcomes (Clark et al., 2016; Fokides, 2020; Gee, 2008). Additionally, research highlights that critical skills such as communication, collaboration, and creativity developed through gaming are essential for 21st-century education (Kaimara & Deliyannis, 2020; Kaimara & Deliyannis, 2019). DGBL's interactive and engaging nature can spark learners' interest and provide a flexible, diverse learning environment. Moreover, game-based learning can simulate real-world scenarios, helping learners practice language skills and enhance discourse comprehension. The importance of fostering learning engagement through game experiences is well established (Ongoro & Fanjiang, 2024).

Despite the significant potential of educational games in language learning, further research is needed to assess their effectiveness and application. Qualitative research methods,

such as interviews, observations, and case studies, can provide deeper insights into learners' experiences and perspectives. This study aims to explore the motivations, experiences, and challenges of international students using educational games to learn Chinese. The goal is to understand how educational games influence language learning processes and how to optimize their design to better meet learners' needs. The findings will offer empirical support for the application of educational games in international Chinese education and provide guidance for educational practice and game design.

## 2. Theoretical framework

### 2.1 Educational game theory

**Goal-Setting Theory:** Goal-setting theory emphasizes that goals provide individuals with a clear direction and measurable outcomes, thereby helping to define the tasks that need to be completed (Kapp, 2014). Research shows that specific, direct, and moderately challenging goals are more likely to motivate individuals than abstract, vague, or inappropriate goals (Locke et al., 1981). In addition, the provision of immediate feedback, such as reward mechanisms commonly found in gamification practices, enables participants to assess their progress towards goals and determine whether they need to adjust strategies to achieve goals more effectively (Locke & Latham, 2002).

**Self-Efficacy Theory:** Self-efficacy theory states that individuals' beliefs in their ability to cope with future situations, that is, self-efficacy, will affect the effort and persistence they put into overcoming difficulties (Bandura, 1982). By successfully completing a series of tasks that gradually increase in difficulty, individuals' self-efficacy is enhanced. In gamification practices, starting with smaller and less difficult tasks helps build users' self-efficacy. In addition, the use of elements such as point systems, badges, and progress bars, by providing direct progress feedback and performance evaluations, can also motivate individuals' self-efficacy (Gnauk et al., 2012).

**Self-Determination Theory:** Self-determination theory suggests that autonomy, relatedness (or sociality), and competence are three intrinsic psychological needs of humans that can drive individuals to participate in or withdraw from an activity (Ryan & Deci, 2000). Gamification practices provide individuals with the autonomy to choose activities they prefer through different levels of difficulty, thereby satisfying the need for autonomy. This autonomous choice can enhance participants' behavioral and emotional engagement (Skinner et al., 2008). The need for relatedness involves the connection or interaction between individuals and others. The cooperation and competition mechanisms in gamification practices can meet this need, enhance individuals' sense of belonging, and increase engagement (Ryan & Deci, 2000). The satisfaction of competence is related to individuals' pursuit of mastery or learning. Gamification practices that provide progress indicators and immediate feedback help cultivate users' sense of competence (Sailer et al., 2017).

**Flow Theory:** Flow theory describes the experience of individuals when they are completely engaged in an activity (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2009). Conditions that promote flow include clear and

challenging goals, immediate feedback on performance and progress, and appropriate levels of challenge (Nakamura & Csikszentmihalyi, 2009; Shernoff et al., 2003). Gamification practices, such as providing feedback through rewards and setting different levels of difficulty for users to choose from, can help promote flow experiences (Hamari & Sjöblom, 2017).

### 2.2 TAM2 and UTAUT models

**UTAUT model:** The UTAUT model, proposed by Venkatesh et al. (2003), integrates several seminal theories, including the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivation Model (MM), the Theory of Planned Behavior (TPB), the Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT). The UTAUT model aims to provide a comprehensive framework for a more thorough explanation and prediction of user acceptance and technology usage behaviors. The model comprises four core constructs: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). Performance Expectancy refers to the degree to which users believe that using a technology will enhance their work performance; Effort Expectancy denotes the perceived ease of use of the technology; Social Influence pertains to the impact of others or social groups on users during the technology adoption process. Facilitating Conditions refer to the presence of external resources and support that enable users to successfully utilize the technology. Venkatesh & Davis (2000) further proposed four moderating variables: Gender, Age, Experience, and Voluntariness of Use. These variables significantly affect the relationship between core constructs and usage intentions and behaviors. Specifically, Performance Expectancy, Effort Expectancy, and Social Influence directly influence users' intentions to use technology, which in turn affects their technology usage behavior. Facilitating Conditions exert a direct influence on technology usage behavior without the intermediary role of usage intentions. Moderating variables (Gender, Age, Experience, and Voluntariness) affect the relationship between core constructs and usage intentions and behaviors, thereby further influencing user technology acceptance and usage behaviors.

**TAM2 model:** The TAM2 model is an extension of the Technology Acceptance Model (TAM) proposed by Venkatesh & Davis (2000) based on Davis's (1986) model. The core idea of the TAM model is that users' acceptance of an information system is mainly determined by Perceived Usefulness (PU) and Perceived Ease of Use (PEU). The TAM2 model builds upon this foundation by introducing Social Influence and Cognitive Instrumental Processes, which further explain the factors that influence Perceived Usefulness, making the model more comprehensive. Perceived Usefulness refers to the extent to which users believe that using a particular technology or system can enhance their job performance; Perceived Ease of Use refers to the degree to which users believe that using a particular technology or system is easy. Social Influence refers to the impact that others or social groups have on users when using technology, including subjective norms, social image, etc.; Cognitive Tools involve the cognitive processes by

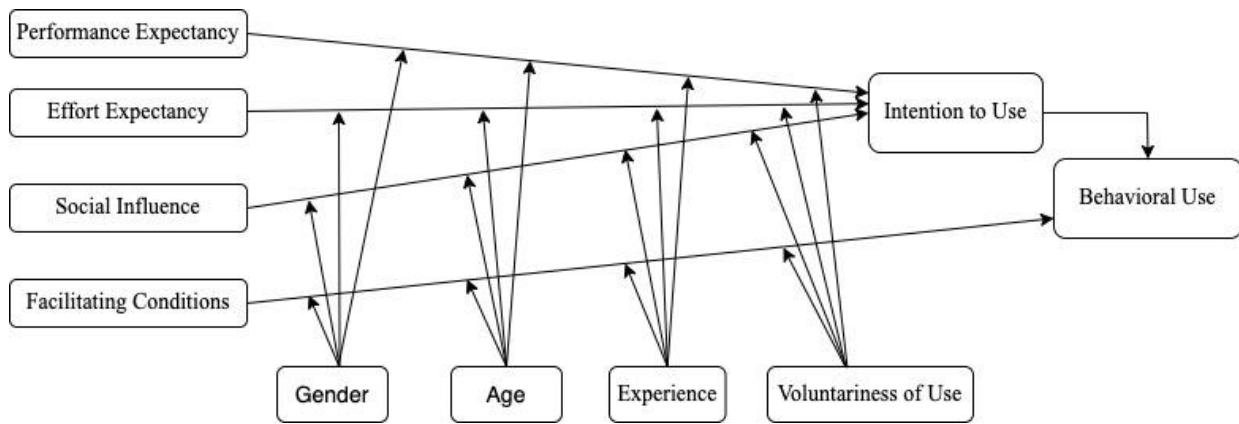


Fig. 1. The UTAUT model framework.

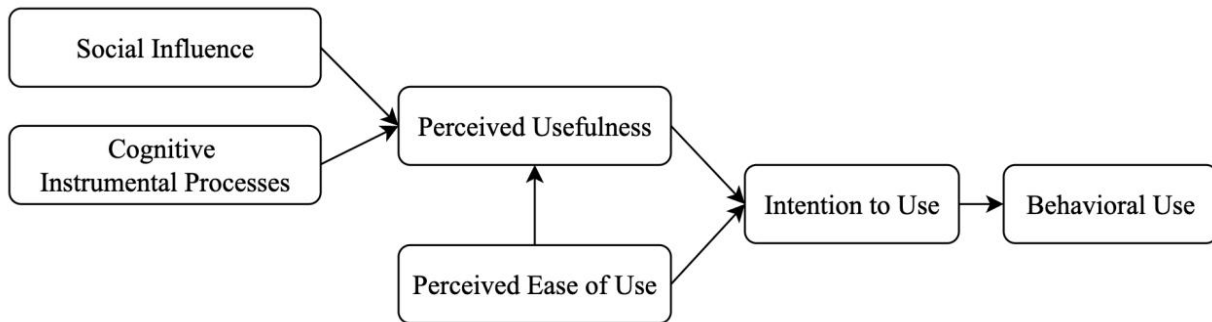


Fig. 2. The TAM2 model framework.

which users improve their work performance or effectiveness through technology, including work relevance, output quality, etc. Specifically, Social Influence and Cognitive Tools directly affect Perceived Usefulness, while Perceived Ease of Use directly affects both Perceived Usefulness and Behavioral Intention. Perceived Usefulness and Perceived Ease of Use work together to influence users' Behavioral Intention, which in turn determines their technology usage behavior. Meanwhile, Cognitive Tools indirectly influence Behavioral Intention and behavior by enhancing users' perception of the usefulness of the technology.

### 3. Research methods

#### 3.1 Research design: Qualitative research method and interview method

This study uses qualitative research methods to deeply understand the experiences, feelings, and attitudes of international students in the process of using educational games to learn Chinese, taking Pakistani students as an example. Qualitative research allows researchers to explore and explain individuals' subjective experiences, revealing the underlying meanings and connections. This study uses interviews as the main data collection method, guiding participants to share their true feelings and specific experiences through open-ended questions. Open-ended interviews allow participants to freely express their ideas and views without being limited to fixed-choice answers. This method helps to obtain richer

and deeper data, enabling researchers to capture participants' subtle reactions and complex emotions to various aspects of educational games.

The interview guide is based on the Technology Acceptance Model 2 (TAM2) and the Unified Theory of Acceptance and Use of Technology (UTAUT) and aims to cover the key factors that affect learners' acceptance and use of educational games. The variables in the TAM2 and UTAUT models provide a clear framework for interview design, ensuring that researchers can comprehensively analyze learners' acceptance and usage behaviors regarding educational games, focusing on key factors such as Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. This approach allows for an in-depth understanding of international students' real experiences and attitudes when using educational games to learn Chinese. For example, in the context of a Chinese learning game, Performance Expectancy reflects learners' views on whether the game can effectively improve learning outcomes. The interview design evaluates learners' expectations about the game's utility through questions like "How relevant is the Chinese learning content provided by the game to your exams or study needs?" to uncover how they perceive the game's impact on enhancing learning effectiveness.

The interview outline is divided into four sections: Learning Background, Perceived Usefulness, Perceived Ease of Use, and Influencing Factors. The Influencing Factors section includes Subjective Norm, Image, Job Relevance, Voluntariness,

**Table 1.** Specific content of the "Influencing Factors" section in the interview outline.

Category	Question
(1) Subjective norm	What percentage of your friends and classmates use this game? How do their opinions influence you? Has your teacher ever recommended using this type of learning tool? Please provide examples. Is it common to use similar learning tools to study Chinese in your social circle? Please provide examples. Would you recommend this game to others who want to learn Chinese? Why?
(2) Image	Does using this game make you appear more innovative in learning within your social circle? Do you think this game can enhance your social or professional image?
(3) Job relevance	How relevant is the Chinese learning content provided by the game to your exams or study needs? Can you apply the Chinese knowledge you learned from this game in your studies or exams?
(4) Voluntariness	Do you use this game to learn Chinese voluntarily, or because of external pressure or requirements? If voluntarily, what are your reasons?
(5) Result demonstrability	How do you demonstrate to others the improvement in your Chinese skills through this game? Have you felt the effects of learning through this game in actual communication? How do you think you should demonstrate the results of your Chinese learning through this game?

and Result Demonstrability.

### 3.2 Participant selection: Five international students from Pakistan

The selection of participants was based on the principle of convenience to ensure the accessibility of the sample. This study invited five international students from Pakistan to participate in interviews, each coming from different majors and possessing unique learning motivations. This diversity allows researchers to gain a deeper understanding of the use of educational games from multiple perspectives, as well as how varying professional backgrounds influence learners' acceptance of educational games and their learning outcomes. All five participants had experience using educational games to learn Chinese, and the research team recorded their background information and learning motivations in detail prior to the interviews. By selecting participants with diverse learning experiences and attitudes, the researchers were able to obtain a comprehensive perspective on the use of educational games.

### 3.3 Data collection and analysis: Open interviews and content analysis

Data collection was conducted through one-on-one open interviews, and the interview time for each participant was determined according to the richness of their shared content to ensure that the views and experiences of each participant were fully captured. During the interviews, the researcher followed a standardized interview outline to ensure that the responses from each participant could be compared horizontally. Researchers recorded the audio data of face-to-face interviews through Tencent Conference and organized them into transcripts after the interview to facilitate subsequent analysis. Content analysis was used for data analysis, which is a process of systematically decomposing text data into meaningful units to identify patterns, themes, and categories.

Researchers first independently read all interview records, opened coding of the data, and marked key concepts and statements. Subsequently, through discussion and comparison, researchers classified these open codes into more abstract concepts to form themes and subthemes.

**Table 2.** Participant demographic information.

Game ID	Major	Age	Experience with educational games
105	Electronic department	31	Yes
106	Electronic department	32	Yes
107	Electronic department	32	Yes
109	Electronic department	30	Yes
114	Management	29	Yes

## 4. Findings

### 4.1 Analysis of learning motivation in educational games

#### 4.1.1 Motivation for learning Chinese

Learning motivation is the intrinsic and extrinsic factors that drive individuals to engage in learning activities. In the context of international students learning Chinese, this study reveals a variety of motivations, mainly including academic requirements, career development, interest in Chinese culture, social needs, and the accessibility of learning tools brought about by technological progress.

Academic requirements are a significant motivation for many international students learning Chinese. For many students, learning Chinese is not only to fulfill degree requirements but also closely linked to their career goals. In interviews, some participants mentioned that the HSK (Hanyu

Shuiping Kaoshi, Chinese Proficiency Test) is a necessary requirement in their study programs, and they must pass a specific level of the HSK to graduate successfully. For example, Participant 105 stated that their primary reason for learning Chinese was to pass the HSK Level 3 exam, as it was part of their degree program. This indicates that the integration of Chinese language learning with academic goals is an important driving factor for students to learn Chinese.

Furthermore, with the advancement of globalization, more and more international students realize that mastering Chinese will give them a competitive advantage in their future careers. Both Participant 107 and Participant 115 mentioned that learning Chinese is not only for academic purposes but also enhances their competitiveness in the global job market. With the rise of China's economy and the increasing influence of Chinese culture, fluency in Chinese, especially in fields such as business, diplomacy, or international relations, has become an advantage for job seekers. Many students believe that strong Chinese language skills will not only open more career opportunities but also help them achieve greater success in cross-cultural communication.

Interest in Chinese culture and social needs Interest in Chinese culture and social needs are other key factors driving international students to learn Chinese. Many students stated that their reason for learning Chinese is not only academic but also stems from a strong interest in Chinese culture. Participant 114 mentioned in an interview that they have had a deep interest in China's history, art, and philosophy since childhood and hope to gain a deeper understanding of Chinese culture through language learning. For them, Chinese is not just a communication tool but an important key to exploring and immersing themselves in Chinese culture. By learning Chinese, they can experience Chinese society, customs, and lifestyle more directly and authentically, thus gaining a deeper cultural experience.

In addition, social needs are also an important driving force for language learning. With the increase in international exchanges, many international students expressed a desire to establish deeper social connections with Chinese friends and classmates. Participant 107 discussed that one of their main reasons for learning Chinese was to communicate effectively with Chinese friends, thus enhancing their social ties. Being fluent in Chinese not only strengthens their social network but also provides more opportunities for language practice, allowing them to better integrate into Chinese social circles. Social needs are closely linked to learning motivation, especially in today's world where cross-cultural communication is increasingly important. Language has become a key tool for building connections and expanding networks.

Technological progress and accessibility of learning tools

In recent years, rapid technological advancements have greatly driven innovation in educational tools, making Chinese language learning more convenient and diverse, especially in the context of globalization, where access to learning resources has significantly increased. The popularity of online learning platforms, language learning apps, virtual classrooms, and educational games has allowed students to learn Chinese in more flexible and personalized ways. Technology not only

breaks the time and space limitations of traditional education models but also provides learners with more interactive and enjoyable learning experiences.

Participant 106 mentioned that they use online courses and language learning apps to assist with Chinese learning, as these tools provide abundant learning resources and interactive opportunities. In addition to textbook learning, they can exchange languages with other learners through online platforms, watch Chinese movies, and participate in Chinese discussions, thereby improving their language skills more comprehensively. More importantly, the accessibility and flexibility of these tools and platforms allow students to customize their learning plans based on their own schedules and progress. For example, some students can study Chinese anytime through mobile apps, even with a busy academic or work life, improving learning efficiency and motivation. With continuous technological development, AI-driven language learning assistants, speech recognition technology, and adaptive learning systems have further enhanced the learning experience, providing more personalized learning and immediate feedback, which in turn strengthens learning motivation and effectiveness.

#### 4.1.2 Analysis of learning motivation

Learning motivation is an intrinsic psychological characteristic that motivates and maintains learners' learning drive. American psychologist Deci & Ryan and others, through research on the degree of autonomy of human behavior, proposed the self-determination theory (Self-determination Theory, SDT), which classifies learning motivation into three categories according to the strength of learning motivation autonomy or the degree of self-determination of learners: intrinsic motivation (Intrinsic Motivation), extrinsic motivation (Extrinsic Motivation) and no motivation (Amotivation) (Ryan & Deci, 2000).

Intrinsic motivation refers to engaging in learning activities for the intrinsic satisfaction of the activity itself, focusing on learning fun, interest, and sense of fulfillment; extrinsic motivation refers to individual behavior being determined by external factors, such as gaining recognition, avoiding punishment, or avoiding a sense of guilt (Ryan & Connell, 1989), which can be further subdivided into external regulation, introjected regulation, identification regulation, and integrated regulation. The main difference between intrinsic and extrinsic motivation lies in whether learners participate in learning for their own internal interest or are driven by external forces. Applying the self-determination motivation theory to the virtual community learning environment, community learners driven by intrinsic motivation participate in community learning out of interest or learning fun to obtain psychological pleasure; Community learners driven by extrinsic motivation participate in community learning to conform to external requirements.

Participant 105's learning of Chinese is more for the purpose of passing the HSK3 level examination through studying abroad, which shows that this participant's educational game learning language is driven by external motivation to a greater extent. And participant 114 and participant 107 are more interested in internal motivation.

Previous research has proposed that both intrinsic and

extrinsic motivation of learners will affect their learning investment in the learning process. It is generally believed that intrinsic motivation can positively predict online learning investment (Kui et al., 2006). When learners mainly participate in learning out of interest and fun, they have stronger self-drive and are more willing to participate in learning. The relationship between extrinsic motivation and online learning investment has not been determined. Some scholars believe that learners driven by extrinsic motivation are more likely to show escape tendency in learning activities, thereby reducing learning investment (Moon & Michele, 2015); Some scholars believe that external motivation can enhance learning investment to a certain extent, and certain external incentives need to be implemented (Hidi & Harackiewicz, 2000). Combining the characteristics of virtual community learners, when the autonomy of community learners is higher, they often join the learning community out of interest or fun factors, which can strengthen learning investment; When community users mainly participate in community learning driven by external factors, they are more likely to have a sense of resentment, but external incentives and constraints can also make learners improve learning investment to a certain extent.

## **4.2 Perceived usefulness of educational games**

The perceived usefulness of educational games refers to learners' overall evaluation of the role played by educational games in the process of learning Chinese. This study learns through interviews that international students have different perceptions and expectations of the usefulness of educational games when using educational games to learn Chinese.

### **4.2.1 Learning Chinese as an auxiliary tool**

In the interview, most participants believe that educational games are a beneficial auxiliary tool. For example, participant 105 pointed out that this game is very useful in repetitive practice, and they believe that if these defects are improved, it will help beginners learn Chinese faster. In addition, participant 107 mentioned that this game is very helpful for learners with a certain foundation in Chinese, especially those who are preparing for the HSK3 level examination. However, for beginners, since all the content in the game operation process is presented in Chinese, they may feel difficult.

### **4.2.2 Comparison with traditional cultural teaching**

In comparison with traditional teaching methods, some participants believe that educational games provide a more flexible and interactive learning method. For example, participant 106 mentioned that the game-based way of learning Chinese can make learning Chinese more interesting, and AI assistants can provide personalized feedback and support. However, there are also participants, such as participant 105, who believe that traditional classroom learning is sometimes more effective because it can directly communicate with teachers and students, while software has limitations in communication.

### **4.2.3 Learners' perception of the relevance of game content**

Content relevance significantly influences learners' perception of usefulness. Participant 106 suggested including basic vocabulary and phrases at the start to improve comprehension. Participant 107 recommended designing games to reflect real-life scenarios, helping learners apply Chinese in practical contexts. In summary, international students have a complex view of the perceived usefulness of educational games. On the one hand, they recognize the potential of educational games in providing interactive learning experiences, increasing learning motivation, and assisting language practice; on the other hand, they also pointed out the shortcomings of educational games in terms of content design, technical implementation, and meeting learners' needs. These findings provide valuable feedback for educational game designers and Chinese language teachers, helping them to improve the game and better meet the needs of learners. Through an in-depth analysis of the interview content, researchers can provide the following suggestions for game design: enhancing the interactivity and personalized feedback of educational games to adapt to the needs of learners at different levels, for example, providing appropriate English subtitles for low-level Chinese learners; designing game content based on real-life contexts to help learners better understand and apply Chinese, which is beneficial for learners to set goals in the game-playing process and improve self-efficacy; incorporating cultural elements into the game to help learners gain a deeper understanding of Chinese culture, and promote the transformation of learners' external motivation to internal motivation; combining with traditional teaching methods to form a complementary teaching model, giving full play to the advantages of both and improving learning outcomes.

## **4.3 Perceived ease of use of educational games**

Perceived ease of use refers to the user's subjective judgment of the ease of using a technology or system. In educational games, perceived ease of use directly affects the user's learning experience and learning outcomes.

### **4.3.1 Operation experience and technical issues**

Operation experience is a key component of perceived ease of use. According to the interview content, some learners encountered operational difficulties when using educational games. For example, participant 105 mentioned that for beginners, the game has a high repetition, and they need to start over if they answer a question incorrectly, which is not only frustrating but also affects learning efficiency. In addition, technical issues also have a negative impact on the operation experience, such as the software translation issue reflected by participant 105, and the noise interference issue mentioned by participant 114.

### **4.3.2 Interface design and user guidance**

Interface design is another important factor affecting users' perceived ease of use. Good interface design can improve user learning efficiency and satisfaction. However, according

to the interview results, some learners believe that there is room for improvement in the game's interface design. For example, participant 106 suggested that some basic vocabulary and sentences should be provided at the beginning of the game to help beginners better understand the content of the dialogue. In addition, participant 109 pointed out that the design of game options needs to be improved to more clearly distinguish between correct and incorrect options.

#### **4.3.3 Learners' suggestions for game design improvements**

Learners have made some specific suggestions for game design improvements. Participant 105 suggested that the software should provide immediate feedback and translation of correct answers to help learners quickly understand. Participant 107, on the other hand, hopes that the game will have English translations to reduce language barriers. Participant 106 suggested that the game should customize personalized learning strategies based on learners' weaknesses and strengths. In addition, participant 109 emphasized the importance of interpersonal interaction, believing that although AI can be helpful in some ways, it cannot completely replace communication between people.

Based on the interview results, learners have complex feelings about the perceived ease of use of educational games. Some learners think that the game is interesting and helpful for learning, but they also pointed out the difficulties in operation, technical issues, insufficient interface design, and lack of user guidance. In order to improve the perceived ease of use of educational games, designers need to consider the following aspects: simplify the operation process, reduce repetitive operations caused by errors; optimize technical performance, ensure smooth game operation, and reduce technical issues; improve interface design to make it more intuitive and easy to understand, and easy for users to get started quickly; provide effective user guidance and feedback mechanisms to help learners better understand and use the game; consider learners' personalized needs and provide customized learning experiences.

### **4.4 Social and cultural integration**

Educational games, as an emerging learning tool, can not only improve language skills but also help learners achieve significant results in terms of social and cultural integration.

#### **4.4.1 The role of educational games in cultural adaptation**

Educational games, by simulating real-life situations, provide learners with a safe and interactive learning environment, helping them better understand and adapt to the cultural background of the target language. For example, participant 105 mentioned that educational games are a comfortable learning method for beginners due to their interesting social activities and environmental design, which helps them adapt to Chinese social culture more quickly. In addition, educational games often contain cultural elements such as festivals, customs, and history, which can enhance learners' understanding and understanding of Chinese culture. Participant 114 stated that learning Chinese is very important for understanding Chinese

culture, and learning Chinese through games helps them gain a deeper understanding and experience of Chinese culture.

#### **4.4.2 Improvement of learners' Chinese communication skills**

Educational games can improve learners' social communication skills through elements such as role-playing and interactive dialogue. For example, participant 107 believes that the situations designed in the game, such as the dialogue between students and receptionists or classmates, can help learners practice how to communicate in real-life situations. In addition, educational games can enhance learners' language confidence, making them more willing to use Chinese in real social situations. Participant 106 pointed out that educational games, in an innovative way through dialogue, help learners learn Chinese, and this learning method helps improve their social image and allows them to better communicate with other Chinese people.

#### **4.4.3 Impact of educational games on image and professional development**

Educational games can not only improve learners' language skills and social skills but also have a positive impact on their personal image and professional development. Participant 105 believes that learning Chinese can make it easier for them to communicate with people in China, which is beneficial to their social and career development. In addition, educational games, due to their innovation and technology, can make learners appear more innovative in their social circles. Participant 109 believes that for the international learner community, using educational games to learn Chinese is an innovative and novel way, which not only improves their social image but also demonstrates their adaptability to new technologies and learning innovation.

## **5. Discussion**

### **5.1 The relationship between learning motivation and learning outcomes**

According to the interview data, learning motivation is a key factor driving international students to learn Chinese. There is a significant correlation between learning motivation and learning outcomes. For example, interviewee 105 stated that they mainly learn Chinese because they need to pass the HSK3 level examination, and this clear academic requirement has become a strong driving force for their learning. *"Actually, we try to learn the Chinese language, because first of all, we have to clear the HSK level 3. So that's why we have to learn the Chinese language, because we don't have any knowledge before this one so during this one that's why we want some software or any other person. That will help us to learn the Chinese."* The strength of learning motivation directly affects learners' participation in educational games and learning investment, thereby affecting learning outcomes. Those learners with clear learning goals and intrinsic motivation, such as interviewee 114, *"I think that was I want to learn Chinese, because everybody think about the bright future.....Yeah, because I think Chinese language is very important to know*

about the Chinese culture. So this is, also from the game, we have learned about language and conversation, or history and art”, usually achieve better results in language learning.

## 5.2 The potential and limitations of educational games in international Chinese language education

Educational games have shown great potential in international Chinese language education. Interviewees 107 and 109 emphasized the advantages of educational games in improving learning interest and providing cultural exchange opportunities. “Yes, because the designed game just like a student or a boy go to reception and asked from him, and he said it could. The next step, he goes to the ground and ask a girl. The two guys can communicate with each other, ‘How are you?’ ‘Where are you going?’ ‘Are you fine?’ ‘May I?’ and phrases like ‘Please tell me how to get to the subway,’ or something similar. That’s why I think this game is interesting and good for communicating with Chinese people.” However, there are also limitations. Some interviewees pointed out that educational games need to be improved in terms of technical implementation, user interface design, and personalized learning support. For example, interviewee 106 mentioned the difficulties at the beginning of the game and suggested adding the introduction of basic vocabulary and sentences to help beginners better integrate into the game learning process. “First, I will tell that if you learned by gaming what that advantages. Like by game, like format, make Chinese engaging and fun. And, I’d have an AI assistant in my inclusion. It can provide personalized feedback and support. Secondly, for this specific game, I think it’s. It does not teach where to start. And how to start like being and new. So, if you start, like, I just gave one out at the school. It should give some words at the start. That we will use these words in this dialogue or in this game, after memorizing and understanding their words. Then if you play the dialogue, I think it will be more helpful. For you, yeah. Like, if you open the game, it starts the dialogue between two person, and you have to select the right and wrong options. So that’s why I’m thinking it needs some improvement, like. If at the start of the game, there is some list of words and along with their English meaning and opinions. It will be more helpful in learning Chinese with the help of the scheme.”

## 5.3 Suggestions for the design and application of educational games

Based on the feedback from interviewees, educational game designers should consider several key aspects to enhance the effectiveness of the games and improve the learning experience. First, it is crucial to incorporate more guidance for beginners and introduce vocabulary, as this can help learners gradually adapt to the game content and operations, reducing the learning burden and boosting their confidence. Second, improving the user interface and interaction design is essential to ensure the interface is simple, intuitive, and easy to understand, which will help learners quickly get started

and enjoy a positive user experience. A clear design not only enhances engagement but also reduces the frustration caused by difficult operations, thereby promoting sustained learning. In addition, integrating artificial intelligence (AI) technology to provide personalized feedback and learning strategies can allow the game to adapt in real-time to the needs of learners at different levels, offering more tailored guidance throughout the learning process and improving overall learning outcomes. Finally, incorporating cultural elements and simulating real-life contexts can closely link language learning with practical applications, enhancing both its usefulness and relevance. By integrating Chinese culture and everyday life scenarios, learners can not only improve their language skills but also deepen their understanding and experience of Chinese culture, making the language learning process richer and more comprehensive.

## 6. Conclusion

The study found that learning motivation is an important factor influencing the effectiveness of Chinese language learning. In modern education, educational games, as an emerging learning tool, have garnered increasing attention due to their significant advantages in stimulating learning interest, promoting cultural exchange, and providing flexible learning methods. However, despite these advantages, educational games still have certain limitations in design and application, which need to be further optimized to better meet the diverse needs of learners. Based on this, the study offers several important insights for international Chinese language education practice.

First, clear learning goals and requirements, such as standardized exams like the HSK, can serve as a key motivating factor for learners, helping them maintain a sense of purpose and accomplishment throughout the learning process. Second, combining educational games with other teaching methods can create a more diverse learning environment, thereby meeting the needs of learners at different levels. For instance, beginners can engage in language input through simple games, while advanced learners can practice language output and gain deeper cultural experiences through more complex games. Lastly, educational games not only promote language learning but also address learners’ cultural adaptation and social needs. By designing educational games that incorporate cultural elements, learners can practice language skills in a relaxed and enjoyable environment, while also enhancing their understanding and experience of Chinese culture. Therefore, the application of educational games in international Chinese language teaching can not only enhance learning motivation and interest but also provide learners with a more comprehensive and flexible learning experience.

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### Conflict of interest

The author declares no conflict of interest.

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