The Development of Chinese Learning Achievement by Learning Management through Game-Based Learning for Primary 5 (Grade 5) Students

Sijia Shen
Master's degree in Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
shen_s@mail.rmutt.ac.th

Rossarin Jermtaisong*
Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
Rossarin_j@rmutt.ac.th

Pornpirom Lhongsap
Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
Pornpirom_l@rmutt.ac.th

Abstract
Game-based learning incorporates game elements into instruction, enhancing its appeal and interactivity. This approach increased students' interest in learning, facilitated more efficient completion of classroom content, and ultimately improved academic performance. The purposes of this study were to: 1) compare Chinese learning achievement before and after learning management through a traditional approach for Primary 5 (Grade 5) students, 2) compare Chinese learning achievement before and after learning management through game-based learning, and 3) compare the Chinese learning achievement by learning management through a traditional approach and game-based learning. The research samples were 60 of the Primary 5 (Grade 5) students, in a Buriram Primary School, Thailand in the 2024 academic year, selected by random cluster sampling. The research instruments were: 1) a learning management plan using a traditional approach; 2) a learning management plan using game-based learning; and 3) a Chinese learning achievement test. The data analysis statistics were mean, standard deviation, and t-test. The results showed that: 1) Chinese learning achievement by learning management through a traditional approach was higher than before at the statistical significance level of .05., 2) Chinese learning achievement by learning management through game-based learning was higher than before at the statistical significance level of .05., and 3) the Chinese learning achievement of those studying by learning management through game-based learning was higher than those studying through a traditional approach at the statistical significance level of .05.
Keywords: traditional approach, game-based learning, Chinese learning achievement

Introduction
Since the implementation of reforms and the policy of opening, China's economic strength has steadily increased, and its international stature has been enhanced. This development sparked widespread interest in China, resulting in a growing number of people wanting to learn the Chinese language. On January 25, 2021, the United Nations World Tourism Organization (UNWTO) made a formal announcement declaring Chinese as the official language of the UNWTO (China Tourism News, 2021). Subsequently, a new trend of enthusiasm for learning Chinese swept across the globe.

The Universal Declaration on Cultural Diversity by UNESCO (2001) stated, 'Cultural diversity served as a wellspring of interchange, innovation, and imagination, just as vital to humanity as biodiversity was to the preservation of ecological equilibrium.' Cultural diversity stood as the shared legacy of humankind, forming the bedrock of human societal advancement and acting as a wellspring of cultural ingenuity and progress. As Zhang Xiaogang (2005) articulated, 'The acceleration of economic globalization underscored the necessity for increased attention to and advocacy for cultural diversity.' Language served as the established conduit of communication.

Among the numerous languages spoken worldwide, Chinese had the largest population of native speakers. Propelled by geopolitical and economic motivations, Southeast Asian nations, with their distinctive ties to China, had progressively adjusted their policies concerning overseas Chinese communities. They implemented a series of measures aimed at fostering and popularizing Chinese education. Over recent years, the advancement of Chinese language acquisition in Thailand has been gradual yet pronounced. This progress has led to heightened demands for effective Chinese language instruction, with teaching methodologies taking center stage in pedagogical research (Xu Chengjing, 2013).

Thailand has established Chinese enrichment courses for elementary school students. The objective was to enhance cultural and educational exchanges between the two nations and pave the way for learners' future development. Fostering students' interest in the Chinese language and establishing a solid foundation have been considered imperative teaching goals (Yin Yuying, 2022). The prevailing situation concerning Chinese instruction had been that, in the majority of schools, Chinese remained an elective subject. To captivate students' attention and nurture their enthusiasm for Chinese, the incorporation of engaging classroom activities and games emerged as an essential instructional component (Yang Jinhua, 2019).

According to the Investigation and Research on the Chinese Learning Status of Primary School Students, there was no apparent disparity in the learning aptitude of elementary school students when it came to acquiring Chinese language skills (Zheng Xiaoyou, 2017). As famously articulated by Einstein: 'The art of teaching was the art of awakening the natural curiosity of young minds to satisfy it afterward' (Einstein, Albert, 1934). Scholars argued that by thoroughly stimulating students' interest throughout the learning process, a positive developmental trajectory could be established, ultimately leading to favorable learning outcomes.

Game-based learning involves integrating games into Chinese instruction. The German philosopher Lazarus (19th century) once proposed that games and entertainment could help people alleviate physical and psychological fatigue caused by strenuous work. He believed that engaging in games and entertainment activities offered a way to eliminate weariness and provide relief. Patrick Zarus (20th century) expanded upon and developed Lazarus's theory, asserting that the concept of play originated from the human need for relaxation. Games and other activities offered an avenue for people to temporarily escape the exhaustion of demanding work. This notion suggested that game activities stemmed from 'racial preferences and racial memories.' Game-based learning sought to empower educators to facilitate instruction through engaging games, enabling students to depart from traditional, monotonous teaching methods. This approach aimed to foster a more relaxed and unconstrained learning environment, stimulating students' enthusiasm for active engagement and exploration. (Wen Jiao, 2022)

Li Qingsong and Xiao Yan (as cited in Wang Lianhui, 2011) pointed out in their work Game Teaching and Its Experiment that the efficacy of game teaching extended beyond facilitating students' easy, enjoyable, and effective grasp of knowledge. It had also been evident in the enhancement of students' self-control abilities, organizational skills, and positive emotional qualities. Both game-based learning and game-based methods served as effective strategies for cultivating such skills (Liu Ziyu, 2020).

The implementation of game-based learning enlivened the classroom atmosphere, heightened students' enthusiasm for learning, improved their attentiveness during class, reinforced memory retention, and elevated the overall teaching quality (Zhang Huijia, 2023). This approach diversified teachers' classroom instruction techniques, stimulated learners' curiosity for learning, and enhanced their learning outcomes, yielding a positive impact (Yin Yuying, 2022).

Recognizing the significance of language learning management, the researcher developed and studied the effectiveness of educational games for the Chinese language. The researcher also compared students' learning achievement in Chinese after using the traditional approach with their achievement after using the game-based learning approach. The researcher envisioned that students would improve Chinese learning achievement in the Chinese language subject while deriving enjoyment and satisfaction from the learning process. Additionally, this perspective guided teachers in enhancing and designing learning management through game-based learning, not only for Chinese language content but also for other subjects, to achieve heightened effectiveness in learning achievement.

Research Objectives
1. To compare Chinese learning achievement before and after learning management through a traditional approach for Primary 5 (Grade 5) students.
2. To compare Chinese learning achievement before and after learning management through game-based learning for Primary 5 (Grade 5) students.
3. To compare Chinese learning achievement by learning management through a traditional approach and game-based learning for Primary 5 (Grade 5) students.

Literature Review
Game-based learning refers to the use of games for educational purposes. It involved defining achievement through games as a learning method without imposing stress or pressure on students, ultimately enhancing their educational levels. This approach facilitated the incorporation of ideas and activities in a stress-free environment, introducing exercises and assessments in engaging ways that encouraged collaborative student participation and fostered

effective learning methods (Kanimozhi and Jayakumar, 2015). Game-based learning and game-based strategies represented trends that were implemented in various settings, including workplace training, education, and social media. Many individuals have encountered game-based engagement techniques in one form or another, whether consciously aware of it or not (Pho Ana and Dinscore Anna, 2015).

Game-based learning involves using language game activities to reinforce and enhance students' acquired knowledge. It served as a means to review and extract practiced language skills and apply them effectively in real-life communication scenarios. This approach not only enlivened the classroom atmosphere but also ensured the attainment of instructional objectives, thereby enhancing overall teaching efficacy. (Zhu Liang, 2008)

The language knowledge acquired through games tended to be more robust because it encompassed elements such as guessing, generalization, imagination, analysis, and imitation. These factors stimulated and reinforced the connections among various variables in students' minds, enhancing memory's ability to trigger knowledge recall and, consequently, promoting structural assimilation (Wang Chuming, 2008).

Game-based learning was used to carry out teaching activities, and teaching goals were achieved through games (Zhang Huijia, 2023). Wu Yexian defined game-based teaching as "a teaching activity that closely combines educational and game elements, allowing students to learn more naturally in a relaxed environment with strong interest." It enabled children to learn in a relaxed and cheerful manner. During the game activities and within that atmosphere, students naturally absorbed the knowledge from the textbook and acquired additional extracurricular knowledge that they were expected to know (Wu Yexian, 1996).

From the study of theoretical concepts in documents and related research, the research conceptual framework was determined as follows:
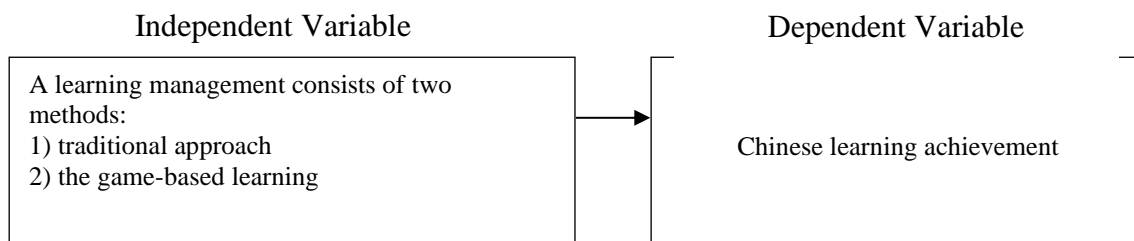

Figure 1 Conceptual Research Framework

Methodology
The study was designed as a quasi-experimental study, specifically utilizing the pretest-posttest control group design. The details of the research methodology were as follows:

1. Population and Sample
This study's population comprised 221 Primary 5 (Grade 5) students and was distributed among 5 classrooms in Thailand, in the 2024 academic year. The sample for this study consisted of 60 Primary 5 (Grade 5) students from two classrooms, selected through cluster random sampling. One class (30 students) was chosen as the experimental group, where students received instruction through game-based learning management, while the other class (30 students) was chosen as the control group, where students received instruction through the traditional approach.

2. Variables
The independent variables in this research comprised two methods: 1) the traditional approach and 2) game-based learning in the Chinese language course. The dependent variable in this research was the achievement of the Chinese language course.

3. Research instrument
The research instruments used in the experiments and data collection were divided into categories as follows:
3.1 The learning management plan using a traditional approach in the Chinese Language Course, Learning Areas: Foreign Languages for the Primary 5 (Grade 5) students was Unit 1, Language for Communication, followed by 2 Title 1) Hometown, and 2) I'm from Beijing. The plan consisted of 3 steps: 1) the introduction, 2) teaching, and 3) the conclusion stage. The IOC (Index of Item Objective Congruence) learning management plan using a traditional approach was equal to 1.00.

3.2 The learning management plan using game-based learning in the Chinese Language Course, Learning Areas: Foreign Languages for the Primary 5 (Grade 5) students was Unit 1, Language for Communication, followed by 2 Title 1) Hometown, and 2) I'm from Beijing. The steps of game-based learning could be roughly summarized in the following way:

Steps 1 Teaching Preparation: Preparation before teaching involved defining the scope of instruction, clearly articulating learning objectives aligned with the content, and gaining an understanding of the students' characteristics in advance.

Steps 2 Teaching: Various content areas were selected to support a diverse range of game preparations, and the necessary game tools were prepared in advance.

Steps 3 Game Demo: The individual differences among students were carefully considered, and the principle of tailoring instruction to each student's aptitude was adopted. Games were then appropriately adjusted and innovated to maximize their effectiveness.

Steps 4 Game Development: The rules of classroom games were clearly explained and demonstrated to ensure that students fully understood and could actively engage with them. Throughout the process, students' adaptability and reactions were carefully observed.

Steps 5 Summary and Evaluation: The teaching outcomes were assessed and summarized, with ongoing improvements made to the process.

The IOC (Index of Item Objective Congruence) learning management plan using game-based learning was equal to 1.00.

3.3 The learning achievement test for the Chinese language course for Primary 5 (Grade 5) students contained 30 multiple-choice questions, each with 4 options for the pre-test and post-tests in the experimental group and control group. The analysis results showed that the IOC value was equal to 0.60-1.00. Thirty quality items were selected for the test. The analysis showed the test had a difficulty of 0.40–0.80 and a discriminating power of 0.50–0.80. The results were analyzed to determine reliability by Cronbach's alpha coefficient (α). The analysis results showed that the total confidence value was 0.925.

4. Data Analysis

The data analysis for hypothesis testing employed both dependent and independent sample t-tests. The dependent sample t-test was utilized to compare Chinese learning achievement before and after the implementation of traditional learning management among Primary 5 (Grade 5) students. Similarly, the dependent samples t-test was used to assess the Chinese learning achievement before and after the application of game-based learning management within the same group of students. Furthermore, an independent sample t-test was conducted to compare the Chinese learning achievement between students exposed to traditional learning management and those who experienced game-based learning in Primary 5 (Grade 5).

Findings

1. The analysis compared Chinese learning achievement before and after learning management through a traditional approach for Primary 5 (Grade 5) students.

Table 1 shows the mean, standard deviation, dependent sample t-test, and level of statistical significance in the analysis to compare Chinese learning achievement before and after learning management through a traditional approach for Primary 5 (Grade 5) students.

The learning management through a traditional approach	n	$\bar{x}$	s	t	df	Sig.
Before	30	20.03	4.902	4.372	29	0.161
After	30	21.43	4.599			

*p< .05

Table 1 showed that the students' mean Chinese learning achievement before the traditional approach was 20.03 ($\bar{x}$ = 20.03, S.D. = 4.902), and after learning, it increased to 21.43 ($\bar{x}$ = 21.43, S.D. = 4.599). When comparing the test scores for both tests, it was found that students' Chinese learning achievement after learning management through the traditional approach was significantly higher than before at a statistical significance level of .05.

2. The analysis compared Chinese learning achievement before and after learning management through game-based learning for Primary 5 (Grade 5) students.

Table 2 shows the mean, standard deviation, dependent samples t-test, and the level of statistical significance in the analysis to compare Chinese learning achievement before and after learning management through game-based learning for Primary 5 (Grade 5) students.

The learning management through game-based learning	n	x̄	s	t	df	Sig.
Before	30	20.93	3.667	30	20.93	3.667
After	30	23.93	3.062			

*p< .05

Table 2 showed that the student's learning achievement in the Chinese course had a mean of 20.93 (x̄ = 20.93, S.D. = 3.667) before the game-based learning and 23.93 (x̄ = 23.93, S.D. = 3.062). Comparing with t-scores, it was found that the student's Chinese learning achievement after the game-based learning was significantly higher than before, at a statistical significance level of .05.

3. The analysis compared Chinese learning achievement through learning management through a traditional approach and game-based learning for Primary 5 (Grade 5) students.

Table 3 shows the mean, standard deviation, independent samples t-test, and the level of statistical significance in analysis to compare Chinese learning achievement by learning management through a traditional approach and game-based learning for Primary 5 (Grade 5) students.

Learning Management	n	x̄	s	t	df	Sig. (2-tailed)
The learning management through a traditional approach	30	11.73	1.701			
				-4.254*	58	0.000
The learning management through game-based learning	30	13.83	2.102			

*p< .05

Table 3 showed that the students' Chinese learning achievement had a mean score of 21.43 (x̄ = 21.43, S.D. = 4.599) with the traditional approach and 23.93 (x̄ = 23.93, S.D. = 3.062) with game-based learning. When comparing the test scores, it was found that the Chinese learning achievement of students using game-based learning was significantly higher than those using the traditional approach, at a statistical significance level of .05.

Discussions
1. Chinese learning achievement by learning management through a traditional approach was higher than before at the statistical significance level of .05 because the traditional approach was the teachers' ability to provide personalized attention and immediate feedback to students. This direct interaction allowed educators to address individual student needs, helping to clarify misunderstandings and guide learning effectively (Hattie and Timperley, 2007). Students were motivated by both the teacher and their classmates. It was a strategy in which a teacher moderated and controlled the flow of information and knowledge. Students were required to continue strengthening their topic knowledge outside of school by completing homework activities. Students' sole resource in this situation was their instructor, who only taught them face-to-face (Meghana Vyas, 2023). Although traditional lecture-style teaching, it could be effective at improving test scores.

According to the study conducted by Guido Schwerdt, et al. (2011), increasing the overall time devoted to lecture-style teaching led to an increase in test scores when explicitly including the two problem-solving categories and the other class activities. In congruence with the findings of Pittayarat Yamprayoon (2020), the research results were that Chinese speaking skills for everyday use of secondary 4 students before and after learning through conventional learning management were different at a significance level of .05. According to a study by Wang and Wu (2020), students who were taught using traditional methods, which included structured classroom settings and direct teacher-student interaction, showed a significant improvement in their Chinese language achievement. The study also reported a statistically significant increase in test scores, with a p-value of less than .05, indicating that traditional learning management had a positive impact on student outcomes.

2. Chinese learning achievement by learning management through game-based learning was higher than before at the statistical significance level of .05 because game-based learning involved using language game activities to reinforce and enhance students' acquired knowledge. It served as a means to review and extract practiced language skills and apply them effectively in real-life communication scenarios. This approach not only enlivened the classroom atmosphere but also ensured the attainment of instructional objectives, thereby enhancing overall teaching efficacy. (Zhu Liang, 2008) According to Perrotta et al. (2013), game-based learning (GBL) is a methodology that incorporates elements of game theory into the educational process. It was compatible with students because games were a necessary element that should have existed in their learning process. In congruence with Wu Yexian's (1996) game-based learning, students learned more naturally in a relaxed mood with strong interest. It allowed children to learn in a relaxed and cheerful way. In the game activities and atmosphere, students

naturally learned the knowledge in the textbook and acquired more extracurricular knowledge than they would have otherwise. Moreover, Fajarina (2017) stated that utilizing games in the classroom encouraged students to be more involved and engaged with each other. In alignment with this, students exhibited increased enthusiasm for playing games, attributing their positive feelings to the engaging and stimulating nature of the learning process.

Following the findings of Xiaolin Yang (2019), students' learning ability in reading Chinese aloud after using games and learning activities was higher than before using them, with a significance level of .05. The students' posttest mean was 27.03, whereas the students' pretest mean was 13.57, respectively. In line with the findings of Pimporn Wattanakamolkul and Manorat Somkanae (2021), the comparison of learning by memorization before and after teaching and learning management by using games through applications showed that scores after learning were significantly high at the level of .01. Consistent with Kamonwan Satsin, et al. (2019), after using games, the students had post-achievement test scores higher than the pretest at a .05 statistically significant level, according to the hypothesis that using games for students would increase students' achievement of Pinyin reading and enhance Chinese learning. Similarly, Waralee Rungbanjit and Woratha Rungbanjit (2021) found that after implementing Chinese word games, the mean posttest score of 35 students was 15.11, which was higher than the mean pretest score of 9.46, accounting for the difference of 5.66 points with a statistical significance level of .05. Research showed that game-based learning had learning management efficacy for increased academic results.

3. Chinese learning achievement of those studying by learning management through game-based learning was higher than those studying through a traditional approach at the statistical significance level of .05, because the traditional approach was a one-way conversation in which an instructor delivered the information before the audience (Gholami, et al., 2016). After the lecture, the instructor gave notes and assigned some tasks as homework (Gregorius, 2017). In traditional lecture teaching methods, no feedback session for the learners was conducted (Almanasef, et al., 2020). Very little conversation happened between the learners and instructors (Sarıhan, et al., 2016). The learners received a passive strategy of learning (Maqbool, et al., 2018), while the game-based learning was conducted through captivating games, allowing students to break away from monotonous teaching modes, acquire knowledge in a more relaxed and unrestricted manner, and stimulate their enthusiasm for active learning and exploration (Wen Jiao, 2022). Consistent with Li Qingsong and Xiao Yan (as cited in Wang Lianhui, 2011), in their work "Game Teaching and Its Experiment," the efficacy of game teaching had gone beyond facilitating students' easy, enjoyable, and effective grasp of knowledge. It has also been evident in the enhancement of students' self-control abilities, organizational skills, and positive emotional qualities. Both game-based learning and game-based learning served as effective strategies for cultivating such skills (Liu Ziyu, 2020).

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Conclusions
Game-based learning integrated the use of games as a tool for teaching children new concepts, transforming schoolwork from a source of stress into an enjoyable and engaging experience. This approach fostered a collaborative environment where children worked together, exchanged ideas, and practiced newly acquired knowledge in a relaxed setting. As a result, it enhanced their understanding and made the learning process more enjoyable. To effectively incorporate game-based learning into traditional classrooms, it was recommended that teachers integrate appropriate game elements into their teaching strategies. For instance, educators could have increased students' interest and participation by designing educational games, organizing group competitions, or implementing interactive classroom activities related to the course content. To ensure the successful implementation of game-based learning, teachers required professional development training. This training should have covered game design principles, techniques for integrating games into the classroom, and methods for aligning games with course objectives. By enhancing their expertise in game-based teaching methods, teachers were better equipped to design and implement gamified instructional activities, ultimately improving both teaching quality and student learning outcomes.

Future research should have delved into the specific effects of different types of educational games, such as simulation games, role-playing games, and puzzle games, on student learning outcomes. By comparing the impact of various game types on teaching, researchers could have determined which types were most effective in enhancing student learning. These studies would have assisted educators in selecting the game types that best aligned with their teaching goals and met the needs of their students, thereby optimizing educational outcomes. Additionally, game-based teaching not only influenced academic performance but also affected students' psychological and emotional development. Future research should evaluate the effects of game-based teaching methods on students' mental health, stress levels, emotional regulation, and self-efficacy. Understanding the potential of game-based learning to promote students' mental well-being and emotional development would have helped educators use these methods to enhance overall student performance.

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