



## GAMIFICATION WITH VISUAL THINKING CONTINUUM TO FOSTER COLLEGE STUDENTS' ENGLISH READING SKILL AND MOTIVATION

### GAMIFICACIÓN CON PENSAMIENTO VISUAL PARA FOMENTAR LA LECTURA EN INGLÉS Y LA MOTIVACIÓN EN ESTUDIANTES UNIVERSITARIOS

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#### ABSTRACT

In today's globalized world, proficient English reading skill is essential for personal success. However, students often encounter challenges in acquiring it. The study examines the effectiveness of combining gamification with visual thinking continuum (VTC) to improve English reading skill and motivation among Chinese first-year college students in an online learning context. Eighty-two first-year undergraduate students majoring in Chinese Language and Literature participated in a 14-week online English course that incorporated gamification elements like points, badges, leaderboards, and levels. Using a mixed-methods approach, the study employed data logging to assess changes in reading skill and pre- and post-tests for motivation. Quantitative results indicated significant improvements in both areas following the intervention. Qualitative data from in-depth interviews further revealed participants' positive learning experiences, highlighting the motivational advantages of the gamified visual thinking continuum. These findings demonstrate that integrating gamification with visual thinking continuum can enhance affective aspects of language learning, making reading skill acquisition more effective. The study offers practical implications for educators and researchers interested in leveraging online gamified learning to foster reading skill and motivation.

#### Keywords:

Gamification, visual thinking continuum, online learning, English reading skill, motivation.

#### RESUMEN

En el mundo globalizado actual, dominar la lectura en inglés es esencial para el éxito personal. Sin embargo, los estudiantes a menudo encuentran dificultades para adquirirla. El estudio examina la eficacia de combinar la gamificación con el Continuum de Pensamiento Visual (VTC) para mejorar la comprensión lectora en inglés y la motivación entre estudiantes universitarios chinos de primer año en un contexto de aprendizaje en línea. Ochenta y dos estudiantes de primer año de la carrera de Lengua y Literatura China participaron en un curso de inglés en línea de 14 semanas que incorporó elementos de gamificación como puntos, insignias, tablas de clasificación y niveles. Mediante un enfoque de métodos mixtos, el estudio empleó el registro de datos para evaluar los cambios en la comprensión lectora y pruebas previas y posteriores para la motivación. Los resultados cuantitativos indicaron mejoras significativas en ambas áreas tras la intervención. Los datos cualitativos de entrevistas en profundidad revelaron además las experiencias de aprendizaje positivas de los participantes, destacando las ventajas motivacionales del Continuum de Pensamiento Visual.



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gamificado. Estos hallazgos demuestran que la integración de la gamificación con el Continuum de Pensamiento Visual puede mejorar los aspectos afectivos del aprendizaje de idiomas, haciendo más efectiva la adquisición de la comprensión lectora. El estudio ofrece implicaciones prácticas para educadores e investigadores interesados en aprovechar el aprendizaje gamificado en línea para fomentar la habilidad y la motivación para la lectura.

#### Palabras clave:

Gamificación, continuum de pensamiento visual, aprendizaje en línea, habilidad de lectura en inglés, motivación.

#### INTRODUCTION

In a globalized and digitized world, proficiency in English reading enables EFL learners to access information and interact with different cultures efficiently (Budiman et al., 2023). The Chinese Ministry of Education has underscored the importance of integrating technology into education, recognizing it as a crucial driver of educational modernization (Tang et al., 2024).

However, based on the current study on online technology in students' learning, Chinese students encounter a great many challenges in online English learning, particularly in sustaining motivation. Online learning poses a challenge to students' engagement, as the lack of direct supervision can make it difficult to sustain focus. Furthermore, acquiring diverse knowledge and skills is highly dependent on students' enthusiasm and interest (Anwar et al., 2023). It is important to note that motivation, which means gaining interest from activities and sustaining post-course learning, can play a key role in overcoming challenges, but research on the motivation of online English learning is still limited.

Many recent studies emphasized the significance of integrating online technology into English learning. According to Van et al. (2023), their studies show that the using of online technology in English learning can lead to more effective and faster mastery of English skills. Researchers (Patra et al., 2022) are also investigating the potential of online learning as a tool for enhancing reading skill. Numerous studies have analysed the relationship between online English language learning and reading proficiency, consistently reporting a positive correlation. Studies also show that online technology needs to be well designed to better improve students' English reading skill.

Gamification, the integration of game elements into non-game contexts (Casimiro et al., 2025), is commonly utilized as an innovative solution to this issue. By incorporating game elements like points, badges, leaderboards, and levels into college English learning, gamification aims to enhance students' reading skill and their learning

motivation by creating a more immersive learning experience (Huseinović, 2024). This study aims to investigate how gamification elements impact both the English reading comprehension and learning motivation of college students. The results are intended to offer practical guidance for educators who want to integrate engaging and effective methods into their English as a Foreign Language (EFL) instructing.

The theoretical foundation of this research is built upon the principles of visual thinking continuum (VTC), which posits that the use of visual aids can significantly enhance cognitive processing, information retention, and comprehension (Atan et al., 2021; McLoughlin & Krakowski, 2001). When applied to reading, visual tools help learners structure textual information, identify key concepts, and draw connections, thereby reducing cognitive load (Atan et al., 2021). Simultaneously, gamification has gained considerable traction in education for its ability to boost engagement, motivation, and perseverance. The study aims to combine these two effective methods and speculate that their combination can create a more robust and efficient learning environment.

While numerous studies have independently explored the benefits of gamification or visual thinking in education, there is a discernible gap in the literature regarding their combined application specifically for English reading instruction. Therefore, this study seeks to enhance existing literature by integrating gamification elements, rooted in Visual Thinking Strategies (VTC), into online College English course. The primary objective is to create an engaging, game-like environment that caters to students' visual learning needs. This approach aims to achieve two specific goals: first, to directly improve the reading skill of Chinese first-year college students, and second, to boost their learning motivation.

Online technology has significantly impacted on English language learning in recent years as it can make English learning more effective and accessible for learners who want and must master the language. Numerous research has compared the effectiveness of online language learning to traditional classroom instruction. Online technology has greatly assisted English language learning and has been a major driver of promoting language learning (Bećirović et al., 2021). It's important to keep in mind that online technology in language learning is continuously evolving, and new research and developments may have emerged.

Online technology is one of the essential backbones in language learning in modern time and applying technology into English language learning is very important. The integration of modern technology is a significant advancement in contemporary English learning and applying

online technology in English language learning is becoming increasingly prevalent and productive for learners (Dincer, 2020). Integrating modern technology into English learning can enhance the overall efficiency of English learning.

Online technology has had a significant impact on the education system, and technical advancements in education have made learning easier for students. The usage of educational technology by students greatly raises their self-efficacy (Haleem et al., 2022). Technology offers a range of ways that can be used by English learners to improve their English language skills (Bećirović et al., 2021). Using technology in learning English language has increased during the previous years, and participants' language learning experience with technology-based learning is relatively good (Bećirović et al., 2021).

According to the previous study on technology in English learning, we can see that many researchers say technology has nowadays become imperative in the process of language learning (David & Sulaiman, 2021). It is a crucial element of the contemporary educational process in both schools and universities. It is important to integrate technology into the field of education because learners can benefit so much with the help of modern technology (Abdulrahman et al., 2020). The goal of using online technology in learning English brings a strong potential to enhance and promote learners' English learning (Manu, 2023).

College students learning English as second language (ESL) in China often encounter a variety of challenges that can affect their overall learning experience and language skills (Lin & Liu, 2021). This passive approach often results in difficulty visualizing the learning content for students, as noted by Yang and Pongpairorb (2021). According to McLoughlin & Krakowski (2001), students' visualization is a hierarchical process that begins with thinking in their minds about what they want to know. Then their imagination takes them to the point where they want to learn and explore further what they have been thinking about. Following that, a person's visualization progresses to a higher level, where they are able to communicate and explain what they have learned or understood using visual aids. This hierarchical visualization process is known as the Visual Thinking Continuum (VTC).

As presented by McLoughlin & Krakowski (2001), Visual Thinking Continuum involves three stages: visual thinking, visual learning, and finally visual communication. Visual Thinking Continuum can enhance students' learning by ensuring that learners have a clear understanding of what they are learning (Atan et al., 2021). By incorporating VTC into English learning, learners can be more involved and learn English reading skill more effectively to comprehend

complex concepts. This approach enhances inclusivity in education, ensuring that individuals with varying learning preferences can access and benefit from the learning material (Atan et al., 2021).

Employing VTC in English reading learning can contribute to a more comprehensive and inclusive learning experience for students. Therefore, there is a great need to integrate VTC in English reading learning. Based on the research by Damayanti et al. (2020); and Sanati (2020) previous studies have also highlighted the effectiveness of integrating visualization into English reading learning, resulting in improved English reading skill among students. Atan et al. (2021) and McLoughlin & Krakowski (2001) suggest that VTC can significantly enhance English language learning outcomes and it can also greatly benefit and enhance the learning process, so that learners may have an excellent chance to focus more intently and enjoy their learning.

When learning English, VTC, which can boost learners' interest and memorability (Atan et al., 2021), could be utilized to English language learning to enhance learners' language skill. Visualization thinking can make learning more enjoyable, and students are more likely to remain attentively that is visually stimulating (Atan et al., 2021; McLoughlin & Krakowski, 2001). When language is associated with images, learners internalize what they are learning more effectively. VTC is especially beneficial for learning English when combined with other methods.

Gamification in English learning, like in many other educational contexts, has drawn significant interest from researchers and educators. It makes use of game elements and principles to increase learners' motivation and effectiveness (Ryan & Deci, 2020). Gamification incorporates game-like aspects like points, leaderboards, and badges into conventional learning environments. It uses competition, prizes, and progress tracking to increase learners' motivation. Gamification can be easily incorporated into regular learning without interfering with class plans. Numerous studies have emphasized the beneficial effects of gamification on students' learning motivation (Hellín et al., 2023; Huseinović, 2024). Research has also shown that learners can have enjoyable opportunities to practice and strengthen their English skills through the application of gamification elements (Hellín et al., 2023).

Gamification can be advantageous for a variety of educational levels, and it is indeed beneficial for English language learners (Thurairasu, 2022). Implementing gamification in education can be a viable strategy to enhance students' performance, and gamification can generate and increase the overall autonomy and motivation of learners in an intensive and surprisingly interesting way and have an overall significant effect on educational outcomes. It explains how to apply advantage of the potential benefits

of gamification to enhance students' learning experiences and produce fruitful learning results. Gamification elements like points, leaderboards, and leaderboards could promote learning and students' reading comprehension improved when gamification elements were used (Hellin et al., 2023).

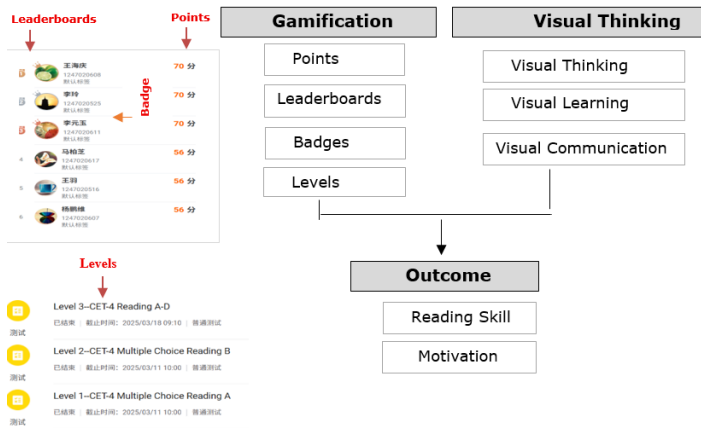
Gamification plays a significant role in motivating English learners (Hellin et al., 2023) and has been instrumental in the development of gamification strategies. These strategies leverage game design elements to fulfil learners' needs and promote their learning motivation, which is the driving force that supports learners in coping with language acquisition challenges (Smiderle et al., 2020). Whether it's for personal, academic, or other goals, a proactive approach to learning English goes a long way toward successfully mastering the language. However, despite the growing interest in gamification; there remains a lack of unified conclusion regarding its exact impact on motivation. To bridge this gap, it is essential for research endeavors to provide a deeper understanding of the intricate connection between gamification and motivation, ultimately aiding educators in creating more effective learning experiences in English learning environment.

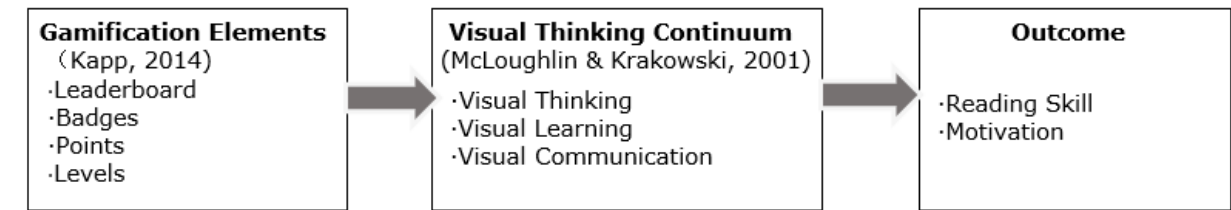
MATERIALS AND METHODS

This study utilizes a gamification framework grounded in visual thinking strategies (VTC) to examine how game-based elements act as mediators for visual learning needs, ultimately improving participants' outcomes. Drawing on this framework, the research incorporates gamification elements, including points, badges, leaderboards, and levels, into an online College English learning course. This approach is designed to bolster students' reading skill and stimulate their learning motivation, a concept visually outlined in Figure 1. By embedding these elements, the learning process is re-configured into an interactive and visually supportive environment that promotes deep engagement with reading tasks and enhances learners' learning motivation.

This study utilized the Ketangpai online learning platform, a tool commonly used in Chinese higher education, to deliver an online College English course. The platform incorporates gamification elements such as points, leaderboards, and badges to create a more interactive and motivating learning experience. Additionally, learning materials were organized into tiers of increasing difficulty to simulate game-like levels. This structure forms a gamified learning environment grounded in the principles of visual thinking continuum (visual thinking, visual learning, and visual communication). While Ketangpai natively supports features like points, leaderboards, and badges, level-based progression was implemented through the instructional design of the course content. The overall structure and VTC-based gamified learning environment on the Ketangpai platform are illustrated in Figure 2.

Fig. 1: VTC-based gamification framework in online College English course.





Source: Authors' own elaboration

Fig. 2: Structure and environment of gamified course framework.Source: Authors' own elaboration

Source: Authors' own elaboration

The research integrates gamification elements based on visual thinking continuum (VTC), as depicted in Table 1. For visual thinking development, students learn through mind-map tasks with different learning objectives to earn points and leaderboards. During visual learning, they complete reading tasks and exercises of different levels by discussing with their peers, earning points and tracking their progress on the leaderboard and badges. To develop visual communication, students can earn points for participating in online discussions. Their performance will be ranked on leaderboards and recognized with badges, fostering a comparative and motivational environment.

Table 1: Mapping game elements based on visual thinking continuum (VTC)

Visual Thinking Continuum	Strategies	Implementation through gamification elements
Visual Thinking	Externalization of information and structural reconstruction By stimulating multiple sensory channels to reach an active and deep learning	Incorporate learning tasks, such as mind-maps and article analyses, which are structured across progressive levels. Students earn points and compete on leaderboards by completing related tasks
Visual Learning	Information transformation and image organization Multisensory input and graphic representation	Points should be awarded according to students' performance. Leaderboards, badges, and levels be utilized to display overall student rankings and provide comparative feedback.
Visual Communication	Audience Interpretation and Critical Discussion Meaningful and informational visually feedback	Students earn points for contributing to online discussion forums. Their performance is then ranked on leaderboards and recognized with badges, providing a comparative measure against their peers.

Source: Authors' own elaboration

Figure 3 provides a comprehensive overview of the gamified learning structure, detailing the learning contents, platform functionalities, and their visual representations available to students. It illustrates the fundamental functions of the Ketangpai platform, where the learning progression is structured into game-like levels. This figure maps the entire gamified learning journey, specifying the tasks students must complete and the associated points and badges they can earn.

Fig. 3: Overview of the Gamified Learning Journey on the Ketangpai Platform





姓名/学号	所属标签	提交时间	客观题	主观题	答题时长	总分
 冯金鑫 1243020408	默认标签	2025-04-23 10:56	14	0	00:00:05	14
 马辉 1243020409	默认标签	2025-04-21 19:23	28	0	00:00:18	28
 兰逸飞 1243020410	默认标签	2025-04-21 19:24	56	0	00:00:07	56
 杨艳 1243020411	默认标签	2025-04-21 19:23	42	0	00:00:12	42
 陈梅梅 1243020412	默认标签	2025-04-21 19:23	42	0	00:00:06	42
 许向通 1243020413	默认标签	2025-04-21 19:22	42	0	00:00:16	42

成绩排名		
1	 凌嘉蔚 1243020451 默认标签	56 分
2	 宋国翠 1243020424 默认标签	56 分
3	 李香 1243020444 默认标签	56 分
4	 徐元观 1243020455 默认标签	56 分
5	 赵炫蓉 1243020450 默认标签	56 分
6	 田学君 1243020440 默认标签	56 分

Source: Authors' own elaboration

This study involved 82 first-year undergraduate students majoring in Chinese Language and Literature at a college in a private college in China, all of whom were enrolled in a gamified College English course. Over a fourteen-week period, participants took part in required interactive tasks, such as online discussions and Q&A matching exercise with answer schemes. To evaluate the effects of the gamified learning approach, students completed a pre-test, a post 1-test, and a post 2-test designed to measure changes in their reading skills and motivation level. Additionally, the study conducted in-depth interviews with twenty students who voluntarily provided valuable qualitative insights that complemented and enriched the quantitative findings.

The research employs three key instruments:

College English Test Band 4 (CET-4 Grading Criteria (Han, 2021) for Chinese Universities, which is created by the Examination Centre of the Ministry of Education of China, is employed to assess participants' English reading skill. CET-4 divided English four language skills into reading, writing, listening and speaking in Chinese college English education settings, and specifically formulated learning objectives under each dimension, which can be assessment statements. The research adopts the assessment statements of the reading dimensions according to research objectives of this study.

For the assessment of motivation, Pre-Extrinsic and Intrinsic Motivation Rubric (Moradi, & Noor, 2022), a well-established instrument in assessing motivation, is employed. The rubric measures from six subscales: extrinsic motivation as external regulation, extrinsic motivation as introjection, extrinsic motivation as identification, intrinsic motivation to know, intrinsic motivation to accomplish, and intrinsic motivation to experience stimulation. The tool classifies motivations into five levels using five-Likert scales. Using a five-point Likert scale, which ranges from 1 (Poor) to 5 (Excellent), the tool classifies motivation into five distinct levels. Minor modifications were made to certain items to enhance their relevance and ensure alignment with the specific learning context and research objectives of this study.

Interviews were also employed, and the aim is to obtain in-depth details such as personal experiences, attitudes, and feelings that are difficult to obtain through direct interaction with the researchers. Thus providing a more comprehensive perspective and explanation of the research problem.

The data analysis was conducted in two phases: quantitative and qualitative. Quantitatively, paired sample t-tests were performed using SPSS version 27 to evaluate changes in reading skill and motivation. Qualitatively, interview responses were examined using thematic coding. This approach provided a comprehensive understanding of the influence of the online gamification learning on students' reading skill and motivation.

## RESULTS AND DISCUSSION

Students' reading skill was assessed based on a Chinese national standardized four-language-skill rubric, namely College English Test Band 4 scoring scale. Across the three modules, students engaged in question-and-answer (Q&A) matching tasks and online discussion activities, with performance scores reflecting their reading comprehension and analytical proficiency.

Table 2. Descriptive Statistics for Reading Skill.

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Reading Skill	82	0.93	3.64	2.4730	0.50814
Post 1-Reading Skill	82	1.43	4.14	3.0000	0.60317
Post 2-Reading Skill	82	2.14	4.43	3.4286	0.47087
Valid N (listwise)	82	-	-	-	-

Source: Authors' own elaboration

According to Table 2, the Pre-Reading Skill score ranges from 0.93 to 3.64, with a mean of 2.47 (standard deviation 0.51), indicating that participants' reading ability before the test was moderately low and individual differences were relatively small. After the first intervention, the mean of Post 1-Reading Skill increased to 3.00 (range from 1.43 to 4.14, standard deviation 0.60), indicating some improvement in reading ability, but a slight increase in individual differences. After further intervention, the mean of Post 2-Reading Skill further rose to 3.43 (range from 2.14 to 4.43, standard deviation 0.47). The results showed that the intervention not only resulted in a significant improvement in participants' overall reading level, but also a reduction in standard deviation, indicating that the difference in reading ability among participants tends to narrow.

Table 3. Normality Tests for Reading Skill.

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-Reading Skill	0.125	82	0.003	0.974	82	0.098
Post 1-Reading Skill	0.092	82	0.081	0.968	82	0.036
Post 2-Reading Skill	0.083	82	0.200*	0.977	82	0.140

Source: Authors' own elaboration

Based on the results of the reading skill normality test presented in Table 3, the two test methods of Kolmogorov-Smirnov and Shapiro-Wilk showed that the significance level of the Pre-Reading-Skill data in the Kolmogorov-Smirnov test was 0.003 ( $p < 0.05$ ), indicating that the normality hypothesis was rejected. The data of Post 1-Reading Skill has a p-value of 0.036 in the Shapiro-Wilk test, which also shows a non-normal distribution. It is worth noting that the data of Post 2-Reading Skill did not reach a

significant level in both tests, indicating that after the intervention, the reading skills data eventually tended to be normally distributed.

Table 4. Friedman Test Statistics for Reading Skill.

N	82
Chi-Square	145.464
df	2
Asymp. Sig.	0.000

Source: Authors' own elaboration

The results of the Friedman test for reading skill are displayed in Table 4, with a chi-square value of 145.464 and 2 degrees of freedom. The result is highly significant, with an asymptotic significance level of less than 0.001, indicating significant differences among the three assessments.

Table 5. Wilcoxon Signed-Rank Test Results for Reading Skill.

Stage Pair	Test Statistic	Std. Error	Std. Test Statistic	Sig.
Pre-Reading Skill vs Post 1-Reading Skill	-.829	0.156	-5.310	<.001

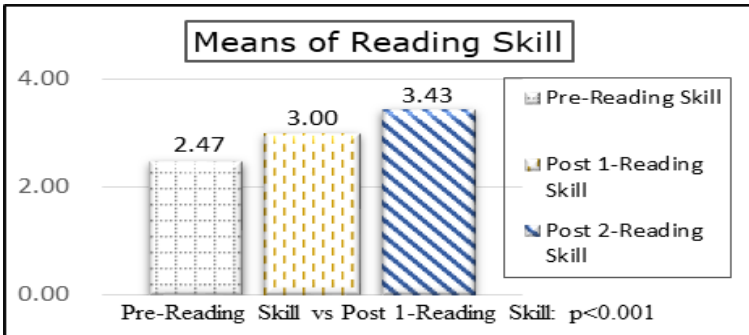
Pre-Reading Skill vs Post 2-Reading Skill	-1.860	0.156	-11.908	0.000
Post 1-Reading Skill vs Post 2-Reading Skill	-1.030	0.156	-6.598	<.001

Source: Authors' own elaboration

Wilcoxon signed-rank test was employed to examine pairwise comparisons between three assessments to investigate these differences in more detail. The results of the difference for paired samples are displayed in Table 5. Reading skill showed a significant improvement from the pre-test to post 1-test. (Test Statistic = -0.829, Sig. < .001), and the difference between Pre-Reading Skill and Post 2-Reading Skill was even more significant (Test Statistic =-1.860, Sig.=0.000). In addition, there was a significant difference between Post 1-Reading Skill and Post 2-Reading Skill (Test Statistic=-1.030, Sig. < .001). The significance level of all tests was adjusted (Adj. Sig.=0.000), indicating that reading skills improved significantly in all three stages, and the improvement was the largest in Post 2 stage.

Figure 4 showed that the means of reading skill demonstrate meaningful changes over time. The overall trend indicates that the means of participants' reading skill gradually increase as the intervention progresses. This means that participants continually improved their English skills over the stages of the study, indicating that the intervention is effective. Figure 4

Fig. 4. Pattern of Reading Skill Means



Source: Authors' own elaboration

Analysis of students' motivation

Students' motivation was assessed using extrinsic-and-intrinsic motivation rubric across the three modules. The scores not only indicate the intensity of students' learning drive but also help evaluate whether the learning strategies employed were effective for their development. By analysing students' motivation patterns, the researcher can gain deeper insights into their needs and refine instructional strategies accordingly. Table 6 presents the scores for Pre-Ext-Int-Motivation Skill, Post 1- Ext-Int-

Motivation Skill, and Post 2-Ext-Int-Motivation Skill

Table 6. Descriptive Statistics for Motivation.

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Ext-Int-Motivation	82	1.67	3.50	2.4553	0.41247
Post 1-Ext-Int-Motivation	82	2.17	4.00	3.0041	0.36942
Post 2-Ext-Int-Motivation	82	2.50	4.50	3.5711	0.38493
Valid N (listwise)	82	-	-	-	-

Source: Authors' own elaboration

Table 6 displays the results of the descriptive statistical analysis of 82 participants' motivation levels. Before the experiment, participants' Pre-Ext-Int-Motivation scores ranged from 1.67 to 3.50, with a mean of 2.46 (standard deviation = 0.41), indicating that the initial motivation level was below moderate. After Post 1-Ext-Int-Motivation, the mean score increased to 3.00 (standard deviation = 0.37), ranging from 2.17 to 4.00, indicating a significant improvement in participants' motivation levels. After Post 2-Ext-Int-Motivation, the mean score improved to 3.57 (standard deviation=0.38),



ranging from 2.50 to 4.50, demonstrating a steady improvement in students' motivation levels. Overall, the motivation level of the participants showed a gradual increase in the experimental process, and the data distribution was relatively concentrated, indicating that the intervention may have a positive effect on participants' learning motivation.

Table 7. Normality Tests for Motivation.

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-Ext-Int-Motivation	0.116	82	0.008	0.959	82	0.010
Post 1-Ext-Int-Motivation	0.139	82	<.001	0.975	82	0.106
Post 2-Ext-Int-Motivation	0.110	82	0.016	0.976	82	0.133

Source: Authors' own elaboration

Table 7 showed the normality of motivational data analysed by the Kolmogorov-Smirnov test and the Shapiro-Wilk test. The results showed that the Pre-Ext-Int-Motivation data was significant in the Kolmogorov-Smirnov test ( $p=0.008$ ) and the Shapiro-Wilk test ( $p=0.010$ ), indicating that its distribution did not conform to the normality hypothesis. The data after Post 1-Ext-Int-Motivation deviated significantly from the normal distribution in the Kolmogorov-Smirnov test ( $p<0.001$ ), but did not reach the significance level in the Shapiro-Wilk test ( $p=0.106$ ). The data after Post 2-Ext-Int-Motivation were significant in the Kolmogorov-Smirnov test ( $p=0.016$ ) but not significant in the Shapiro-Wilk test ( $p=0.133$ ).

Table 8. Friedman Test Statistics for Motivation.

N	82
Chi-Square	160.000
df	2
Asymp. Sig.	<.001

Source: Authors' own elaboration

Due to the distribution of the data, a Friedman test was conducted. According to the results in Table 8, the Chi-Square value is 160.000, the degrees of freedom are 2, and the progressive significance level ( $p < 0.001$ ), indicating that there are statistically significant differences in motivation levels at different time points. Since the previous normality test showed that some data did not conform to the normal distribution, the results of the Friedman test further verified that the change of motivation level before and after the intervention is significant.

Table 9. Wilcoxon Signed-Rank Test Results for Motivation.

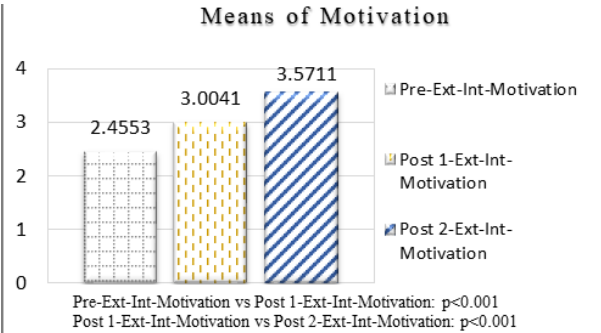
Stage Pair	Test Statistic	Std. Error	Std. Test Statistic	Sig.
Pre-Ext-Int-Motivation vs Post 1-Ext-Int-Motivation	-.976	0.156	-6.247	<.001
Pre-Ext-Int-Motivation vs Post 2-Ext-Int-Motivation	-1.951	0.156	-12.494	0.000
Post 1-Ext-Int-Motivation vs Post 2-Ext-Int-Motivation	-.976	0.156	-6.247	<.001

Source: Authors' own elaboration

According to the results of the Wilcoxon Signed-Rank test in Table 9, there is a statistically significant difference in student motivation levels between all the three stages (all  $p<0.001$ ). Specifically, the motivation after Post 1-test was significantly higher than that of Pre-test ( $Z=-6.247$ ), the improvement after Post 2-test was greater than that of Pre-test ( $Z=-12.494$ ), and there was still a significant improvement after the second intervention compared with Post 1-test ( $Z=-6.247$ ). All comparisons remained significant after Bonferroni correction (Adj.Sig.=0.000), indicating that the intervention had a cumulative effect of continuous enhancement on the improvement of students' motivation level. The results of Wilcoxon's test are consistent with the Friedman test, which verifies the trend of continuous increase in students' motivation level during the intervention.

As shown in Figure 5, there is a clear upward trend across the three assessments. The Friedman Test revealed a significant overall difference across the assessments, while subsequent Wilcoxon signed-rank tests revealed significant pairwise improvements between each consecutive assessment period (all  $p$ -values  $<0.05$ ), indicating sustained motivational enhancement throughout the intervention.

Fig. 5. Pattern of Motivation Means.



Source: Authors' own elaboration

Analysis of interview on reading skill and motivation

To gain deeper insight into students' experiences with the gamified learning, semi-structured interviews were conducted with twenty participants. These interviews explored two key aspects: the effect of gamification on reading skill (through two questions) and its impact on motivation (through three questions). The data were examined using thematic analysis, a process involving data familiarization, code generation, theme construction, revision and refinement of themes, and final reporting.

Interview findings, summarized in Table 10, confirm that gamified learning positively influenced both reading skill and students' motivation. Thematic analysis further revealed that social interaction played a meaningful role, and that the effectiveness of gamification was closely tied to personal interest. Notably, the integration of the visual thinking continuum with gamification elements emerged as a critical factor for achieving successful learning outcomes.

Table 10. Summary of Thematic Analysis.

Main theme	Subtheme	Positive example 1	Positive example 2
Gamification satisfies visual learning	Gamified learning meets learners' visual needs	Leaderboards show my study progress compared to my roommate. This pushes me to keep working hard.	For me, points are the most motivation, points can provide immediate and visible feedback on my progress, encouraging me to continue.
	Integrated learning has novelty and innovation	The integrated learning activity is novel and interesting. Visual thinking makes knowledge more intuitive and understandable, while gamification elements enhance learning motivation.	This combination of learning activities is very innovative and interesting.
Gamified learning can foster reading skill	Promoting interactive reading	My reading has improved a lot. I used diagrams to summarize passages, more interactive than traditional notetaking.	Compared with traditional methods, it is relatively flexible in interaction, allowing repeated targeting individual witnesses, obtaining personalized guidance and being more efficient.
	Enhancing receptive comprehension	I think my reading skill improved the most. Because visualization and gamification enable me to understand the content.	I think my reading has improved the most. This approach provides a large variety of English materials, which are richer than traditional textbook-reading.
Gamified learning can promote motivation	From chore to enjoyment	I became more self-motivated as gamification made English learning fun.	Before, it felt like a burden. After, thanks to gamification, learning became enjoyable and about personal achievement.
	Shift towards intrinsic drive	I became more self-motivated to learn English independently, as the program show me how enjoyable.	I gradually have intrinsic motivation for oneself to learn well and explore English world.
	From novelty to commitment	My interest grew. Initially, curiosity from fun activities, later, sustained involvement due to tangible improvements.	My motivation increased. First short-term excitement from gamification, then long-term engagement with real progress.

Source: Authors' own elaboration

## Discussion on the impact of gamification on students' reading skill

The findings indicate that there is a significant positive effect of the gamified learning on the development of students' English reading skill. Quantitative data from pre- and two post-tests showed notable improvements in students' reading skill. The qualitative insights from the interviews corroborated these results, with students reporting that the gamified elements, such as points and badges, made daunting reading tasks feel fun and enjoyable, thereby encouraging prolonged practice and deeper cognitive engagement with the texts and enhancing their reading skill and learning motivation.

This study contributes to the existing literature by examining how gamification, when integrated into online visual learning environments, can enhance both reading skill and students' motivation (Huseinović, 2024). Current studies have demonstrated the effectiveness of gamification in improving language learning outcomes and keeping students motivated (Huseinović, 2024), particularly in areas such as vocabulary expansion (Panmei & Waluyo, 2022), speaking proficiency, and writing ability, such as expanding vocabulary, improving speaking skill, and writing skills, its specific impact on reading remains underexplored. The present study addresses this gap by contributing new evidence on the role of gamification in developing reading skills within the context of College English courses.

## Discussion on the impact of gamification on students' motivation

The findings of this study demonstrate gamified English learning significantly boosts students' learning motivation. Feedback from interviews further reinforced these outcomes, with learners describing gamification elements heightened their interest and enjoyment. By transforming learning from a chore into an enjoyable experience, gamification fosters intrinsic motivation rather than reliance on external rewards (John et al., 2023). This shift moves beyond initial novelty, encouraging long-term commitment and deeper cognitive engagement in educational activities. These findings are consistent with previous studies suggesting that gamified learning enhances students' motivation to learn. This research thus supplements the current literature with empirical support, affirming that gamification can significantly enhance motivation among college English learners (Huseinović, 2024) by making learning more interactive, rewarding, and emotionally supportive (Saleem et al., 2022). However, there is limited research exploring its long-term effects on motivation. Future research is necessary to further explore how to better promote students' motivation to learn in gamified learning environments.

## CONCLUSIONS

This study conclusively demonstrates that the integration of gamification with visual thinking continuum is a highly effective pedagogical strategy for enhancing both English reading skill and learners' motivation. The quantitative data, evidenced by significant improvements in pre- and two post-tests scores, confirmed substantial gains in reading skill and motivation. Simultaneously, the interview data further support the results of quantitative data, with students reporting that gamified learning experiences felt more engaging and fulfilling. This research provides educators with practical insights for incorporating gamification into English language instruction to improve reading proficiency and increase students' motivation. By creating motivating environments through gamification, instructors can promote greater student investment in reading skill development. It should be noted, however, that the relatively short duration of the intervention may limit the generalizability of these results. Future studies could adopt more methodologically rigorous approaches to investigate the long-term effects and practical application of gamification, enabling a more nuanced and accurate assessment of its impact on reading skill and learners' motivation.

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