

Research Article

The Impact of Gamification on the Time-Limited Writing Performance of English Majors

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In recent years, gamification has developed vigorously in the field of education and there is also a certain amount of research on gamification in the field of foreign language teaching. However, there are few kinds of research on gamification and second foreign language writing, especially the research on gamification and second foreign language time-limited writing, which is still blank at present. This research starts from four aspects: gamification and learners' engagement in class, the effect of gamification on the overall writing abilities, the best gamification degree for writing, and participants' attitude towards gamification in writing practice. The research conducts empirical research to evaluate the role of gamification in time-limited writing in foreign languages. The research results show that gamification has a significant role in promoting the learning of time-limited writing but it is necessary to pay attention to the setting of various elements of gamification. Once the learner's reward reaches the highest value, the effect of gamification will begin to weaken. At the same time, as to some limitations of gamification, like the short duration of gamification effectiveness, suggestions have also been put forward for further research.

1. Introduction

From different angles, there are different definitions of gamification. The widely accepted and recognized definition of gamification comes from Deterding. He believes that gamification is the application of game design elements in non-game situations [1]. In recent years, gamification has flourished in various fields with a lot of applications. It has been widely used in the fields of science [2], mathematics [3], business [4], and education [5, 6]. In addition to those various subjects, gamification is also used as a method to study various learning strategies. The effectiveness of learning strategies like completion of assignments, individual learning [7], and effective assessments [8] can be tested with gamification. According to the survey made by Seaborn and Fels, the largest area of gamification is education [9]. Especially in foreign language education, gamification has started to attract the attention of academia [10–12]. For example,

gamification is considered to be a useful tool to improve English reading abilities [13].

However, compared with the successful research results of gamification in various fields, research on gamification in language learning is still inadequate. Revealing the effect of gamification on the complexity of second language writing requires in-depth and detailed analysis. In the Web of Science database, search with “gamification” and “language” as keywords, the period is from 2017 to 2021, and there are altogether 65 research papers. If the keywords are changed into “gamification” and “Time-limited Writing,” the number of qualified research papers is zero. What is more worthy of our attention is that a small amount of existing research is too ideal for analyzing the effect of gamification and does not consider students' time requirements to participate in various exams and adult high-speed business writing. In common, the elements used in gamification in education are points, badges, and leaderboards (PBL) and awards,

acknowledgments, levels, and feedback should also be significant. However, those current research papers mainly focus on the gamification rewards, such as points, badges, and leaderboards. And as a matter of fact, gamification rewards [14–16] should be more than that. Its essential role is to provide rich feedback, which is also missing in some people's real life. Compared with real life, in the context of gamification, participants can get feedback at every step. This can minimize the pain and fear of failure. Nevertheless, the current researches seldom focus on that point. In addition, are there any disadvantages of excessive gamification? As to that, there are few research mentions at present. All in all, it is evident that the research on second language limited-time writing related to gamification is still lacking and the corresponding empirical research is even rarer.

There are already some valuable researches about gamification and teaching. Hariharasudan et al. believe that in most educational institutions around the world, English is the primary language of instruction. Students' transformable English language skills have a significant impact on their professional development [17]. His study helps to understand the strategic influence of business English in management education; however, his study seldom involves gamification and its effect on teaching. Muangmee et al. maintain that students' behavioral intention to use e-learning tools has a favorable and significant impact on actual e-learning tool use. The student's behavioral intention to use e-learning resources was most positively influenced by the learning value and social distance [18]. But his study mainly focuses on the e-learning tools and pays little attention to the relations between gamification and writing, which will be improved in this paper. Swacha studies gamification application in the area of knowledge management [19], and his study is valuable for the introduction of motivation for knowledge sharing. However, his study mainly discusses the components of gamification, and does not study the influence of gamification, which will be studied in this paper. According to Khalid et al., students' intentions to use MOOCs are highly influenced by four variables: social influence, absorptive capacity, facilitating environments, and perceived autonomy [20]. His study is beneficial for deciding MOOCs, but he did not analyze the details of gamification, which is a promising teaching approach. Khalid et al. also examine the elements that influence a person's decision to take Massive Open Online Courses (MOOCs) [21], and their study tells that facilitating conditions (FCS) have a positive and substantial influence on the behavioral intention to use MOOCs (BI); perceived autonomy (PA) has a positive and significant effect on behavioral intention to use MOOCs (BI). However, their research is somewhat general and the detailed discussion on how to improve the teaching effect of modern educational technology is insufficient, which will be described in detail in this paper.

In this research, we focus on the specific changes and development process of the impact of gamification on the time-limited writing performance of English majors in China colleges. By analyzing the changes in all aspects of writing caused by the application of gamification, we can

reveal the relationship between gamification and second language writing more comprehensively.

2. Research Methodology

In this research, a mixed-method design approach is employed. We picked this style of design because it allows us to use inductive and deductive reasoning approaches to properly describe and explain the phenomenon under investigation from multiple angles. This research incorporated data into both the gathering and analysis processes. In a mixed-method study, we can achieve complementarity, which refers to the use of different methods to investigate different aspects of the same phenomenon in order to gain a more comprehensive understanding. There are two major types of mixed-method designs. On the one hand, quantitative information from online writing and data statistic platforms is collected. The quantitative data was mainly used to show student engagement in gamified writing. On the other hand, qualitative data are gathered by questionnaires completed by students. Because the inquiry was based on a semistructured questionnaire with closed and open-ended items, we started with a convergent, concurrent/embedded design. Using semistructured interviews, we continued with a sequential design. The transformational learning theory was used to provide an implicit theoretical perspective. The qualitative data was utilized to verify the participants' attitude and to gain a better understanding of why and how the gamification strategy affects participants' engagement. The interview with the participants provided a more comprehensive understanding of the gamification intervention. This mixed-method design approach is derived from the previous research on gamification [22–25].

2.1. Research Questions

- (1) Whether the gamified writing group is more obsessed with class learning
- (2) Whether the gamified writing group has noticeable changes in improving students' writing level and whether the fluency, accuracy, and syntactic complexity can be significantly improved
- (3) What is the best gamification degree for writing? Whether the effect of gamification is always positive, and in gamification, whether more rewards will lead to better performance in writing
- (4) What kind of attitude do most participants have towards gamification in writing practice? And whether there is more room for improvement in gamification in writing practice

2.2. *Participants.* 76 undergraduates majoring in English from a national key university (the second year of the university, regardless of gender) participated in this English writing experiment. They are sophomores and recommended by their respective comprehensive English (intensive reading) teachers, representing their class's upper-middle level of comprehensive English ability. After the

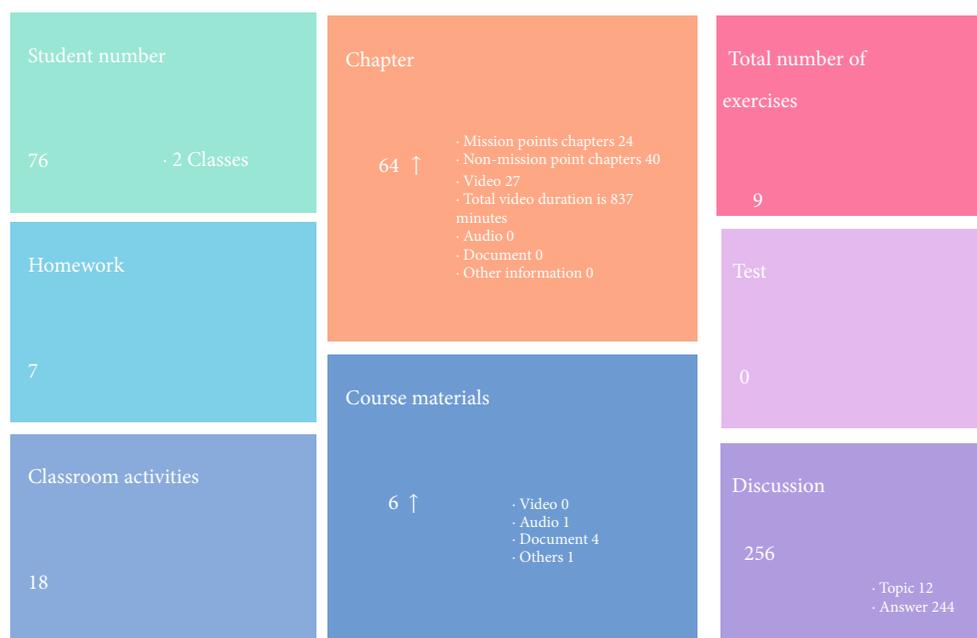


FIGURE 1: The console webpage of the Chaoxing Xuexitong Platform

experiment, all the participants completed the questionnaires. Students were assigned to any of the groups using a random sampling technique.

2.3. Research Design and Procedure. This section reports that the mechanism can be used to divide the students into two balanced groups, i.e., gamified group (experimental) and nongamified group (control). In addition, the details of the gamification tool, experimental procedure, and the evaluation measures in this research will be demonstrated.

2.3.1. Platform Setting. This research uses the Chaoxing Xuexitong platform (<http://i.mooc.chaoxing.com/>) to focus on the degree of learner's engagement in course learning. The platform has a comparatively comprehensive learning detection and data statistical analysis system. Meanwhile, the platform has gamification elements such as points, levels, rankings, and leaderboards. The process in which learners use the platform is the process in which gamification elements imperceptibly exert effects on learners. This research uses data from the Chaoxing Xuexitong platform as illustrated in Figure 1 as follows.

In addition to monitoring and evaluating the learning process of learners, it is also necessary to evaluate the learning outcomes and determine whether gamification has a positive effect on English writing teaching according to the evaluation results. The scoring of essays is exceptionally subjective, so the model of combining the big data cloud scoring system of Pigai (<http://www.pigai.org/>) and the researcher's grading is adopted, which takes into account both the reliability and the validity.

2.3.2. The Details of Research Design. The participants were randomly divided into 2 groups: the gamified writing group and the control group, with 38 people in each group. The

duration of the study is 5 weeks. During this period, both groups will take a comprehensive English class with the same teacher and complete time-limited writing of an English composition every week. In order to facilitate the comparison of the final level of improvement in writing, the essay topics in the first week and the fifth week are the same. It is convenient to study the essays made by the participants on the same topic to find whether there is a substantial improvement in writing expressions. Participants complete it independently during class time and cannot refer to dictionaries or other online tools. The writing time for the participants is 35 minutes, and the word count is about 200 words, which is in line with the requirements of the English Major Level 4 Test or the IELTS.

Gamification elements were introduced into the gamified writing group at the beginning of the first week of the course. Points, badges, leaderboards, tasks, and competitions [26] are included. At the beginning of the first week of the course, the gamified writing group obtained preliminary information about the gamified environment. According to the points that they earned in various teaching activities, they converted the points into levels and awarded badges to participants with outstanding performance. The badges correspond to different levels, and all participants are ranked on the leaderboard according to their points to show their performance compared with their classmates.

The basic unit of introducing gamification is the score. Students will get one point for every score obtained in any assessment tool, including tests and quizzes. Three badges were designed in the gamification: bronze, silver, and gold. If a student performs well in composition writing, he will also be awarded one of three badges. Participants who scored 70–80 points were awarded a bronze badge; participants who scored 81–90 points were awarded a silver badge; participants who scored 91–100 points were awarded a gold

TABLE 1: Research arrangement model.

	Gamified writing group	Control group
Week 1	Topic 1	Topic 1
Week 2	Topic 2	Topic 2
Week 3	Topic 3	Topic 3
Week 4	Topic 4	Topic 4
Week 5	Topic 5*	Topic 5*

*Topic 1 is the same as topic 5.

badge. A student can get at most 5 badges, corresponding to 5 writing tests in the class. In addition, after obtaining any bronze, silver, or gold badges, students will be offered an additional bonus question. They were awarded extra 10 points in the gamification environment if they answered correctly. Groups are handled in the same way as individual students.

The score is further linked to the level to reflect the overall cumulative progress of the student in the course. There are altogether five levels in the gamification environment: stubborn bronze, orderly silver, and glory gold. The reason for classifying the 5 levels is that there is now an online game called *Glory of the King*, which is very popular among young people. There are such 3 corresponding levels in this game, so it is helpful to arouse the interest of young learners. In the instruments performed (adjusted to 100%), the stubborn bronze level is assigned to students with a score of less than 60; the orderly silver level is assigned to students with a score of 60 to 80; the glory gold level is assigned to students with a score of 81 to 100.

After each writing, the participants were asked to report their attitudes towards the gamification environment and its effects. In addition, some research participants were interviewed after the experiment. The research arrangement model is shown in Table 1 as follows:

This study received 380 essays, including 368 valid essays: 190 essays in the gamified writing group and 178 essays in the control group. After the composition test in class, all essays were collected and input into the computer system. In this process, no changes were made to the spelling, grammar, and other errors in the composition. After the students' essays are randomly numbered, they will be scored by the big data cloud scoring system of Pigai (<http://www.pigai.org/>) and the researcher will also score them personally. The scoring standard is based on the requirements of the English Major Level 4 Test or the IELTS; considering the content, structure, and grammar of the article, a total score based on a hundred-point system is given. The big data cloud scoring system of Pigai and the researcher's scoring results are analyzed by SPSS26.0. The correlation value reached 0.76, $p < 0.01$, so the scoring results can be considered to be highly reliable.

3. Results and Discussion

3.1. Gamification and Learners' Engagement in Class. This research uses the Chaoxing Xuexitong platform to study the learners' engagement towards writing knowledge learn-

ing in a gamified environment. From the first lesson of week 1, we have added a variety of teaching and learning activities to the platform. Our platform's statistical system can record the degree of learners' participation in these activities and their activity information. At the same time, the system can monitor every specific activity of learners. When they click on materials, access resources, participate in answering questions, and complete quizzes, the system will record their behavior and quantify them. For example, when learners participate in the quizzes, the time in which the learner completes the test, the accuracy rate, and whether the paper is delayed can be monitored in the system. Watching the learning video can provide data support for their engagement in the course learning. Of course, the system has not reached a high degree of artificial intelligence after all, so it is impossible to judge whether the learners focused on learning the content if we only made the judgment on a single indicator. Sometimes, some learners just open the relevant learning content online but they do not learn. Especially, some young learners cannot stand the "temptation" and switch to the game interface as soon as they slide their hands on the mobile phone screen. For example, some learners set up the split-screen mode. On the surface, they were watching an online class, but the online opera already attracted their attention; some hurriedly submitted classwork, and they secretly played mobile games the rest of the time. It is also true that some learners log into the learning website and make the class video play automatically. In the end, those learners can also get the learning points but they learn nothing. The conclusions will be more reliable when we comprehensively analyze the learner's chapter learning times, chapter task point completion, homework completion, and interaction participation in the question discussion.

In the first week, the gamified writing group studied the course chapters 440 times, while the data for the control group was 381 times. By the 5th week, the number of times for the gamified writing group to learn the course chapters was 433 times, while the data for the control group was 353 times. It can be seen that regarding the absolute number of learning times or the decline in the number of learning times in the final week, the gamified writing group is better than the control group.

There were altogether 22 points released as chapter tasks during the whole experimental period. Each point stands for one class. In terms of average completion progress, the gamified writing group completed 19, while the control group completed 17. The gamified writing group also significantly exceeded the control group.

Among the various indicators of the chapter task points, there is an indicator called the rumination ratio, which can accurately judge the learner's attention to the learning content. Rumination ratio = viewing time/actual video duration. If learners play fast forward or double speed or other means, then, the indicator number will be low, and if they watch multiple times, the data will be high. Playing the teaching video at normal speed and watching repeatedly, the ruminating ratio can reach or exceed 100%. If the rumination ratio is low, the learners should be more careless about the learning materials and vice versa. The average value of the

TABLE 2: Paired sample test: comparison of the first draft and the fifth draft of the gamified writing group.

		Number	Mean	Standard deviation	<i>t</i> value	Sig.
Fluency	Composition for week 1	38	17.32	0.835	-12.391	0.000*
	Composition for week 5	38	20.34	1.016		
Accuracy	Composition for week 1	38	10.65	0.051	-4.82	0.000*
	Composition for week 5	38	14.71	0.057		
Syntax	Composition for week 1	38	12.76	0.055	-2.703	0.019*
	Composition for week 5	38	13.77	0.048		
Morphology	Composition for week 1	38	12.75	0.052	-1.99	0.018*
	Composition for week 5	38	15.76	0.039		

* $p < 0.05$.

ruminant ratio in the first week of the gamified writing group was 109.42%, and that of the control group was 105.03%. By the 5th week, the average value of the ruminant ratio of the gamification writing group was 101.74%, and the value of the control group was 99.86%. It can be seen that in both the first and fifth weeks, the data of the gamified writing group is higher than that of the control group, indicating that the learners in the gamified writing group watched the content longer and were more engaged.

In the homework completion situation, there were altogether 7 assignments released. The average completion rate of the gamified writing group was 72%, while the average completion rate of the control group was 69%. The control group was also significantly lower than the gamified writing group, but the gap between the two groups is not huge. However, the average score of the gamified writing group was 82 and the average score of the control group was 71. From the point of view of homework scores, the gamified writing group was higher than the control group. In addition, when 5 people in the gamification writing group saw the results after finishing the homework, they felt dissatisfied with the results and voluntarily asked to do the homework again. This case did not happen in the control group. It can be seen that in terms of homework completion, the gamification writing group is more concerned and focused than the control group.

In the whole duration of the experiment, a total of 10 topics were arranged for the learners to discuss. The number of participants in the gamified writing group was 15 people, while the number of participants in the control group was 13 people. The data between the two groups are close, but the answer presented by the gamified writing group is more specific and detailed than the control group. The gamified writing group's grammatical use, word choice, and fluency are superior to the control group's performance. It can be seen that the gamified writing group was more positive than the control group.

With the abovementioned data, it can be seen that whether it is the number of chapter learning times, chapter task point completion, homework completion, and interactions participation in the question discussion, the gamified writing group exceeds the control group. It indicated that gamification could improve learners' participation in classroom learning and gamification plays a significant role in learner's engagement. However, this research focuses on

the effect of gamification on the learners' English writing performance, which requires a quantitative analysis of the scores of the two groups of learners.

3.2. The Effect of Gamification on Overall Writing Abilities.

In terms of language expression, the writing level of English composition is typical in four aspects: fluency, accuracy, syntax, and morphology. So we start from these four aspects to examine the effect of gamification on the overall writing level. After five weeks, the gamified writing group and the control group conducted a paired sample test based on the fluency, accuracy, syntax, and morphology. The specific results are shown in Table 2 as follows:

It can be seen in Table 2 that the fluency, accuracy, syntax, and morphology of the fifth draft of the gamified writing group participants are significantly improved compared to the first draft, especially that the p value of fluency and accuracy is $0.000 < 0.05$, which is very significant. At the same time, the p values of syntax and morphology are also significant, indicating that the subjects' language expression level in English composition has been significantly improved through five weeks of learning in a gamified environment.

The statistical table of the paired sample test of the control group after five weeks is shown in Table 3 as follows:

In terms of accuracy, it can be seen in Table 3 that the fifth draft is better than the first draft but it is not significant ($p = 0.056 > 0.05$). There is no apparent difference between the syntax and morphology of the first draft and the fifth draft. It can be seen that the comprehensive writing ability of the participants in the control group did not improve significantly after five weeks of training. Of course, due to repeated writing training, the participants in the control group have improved fluency in English writing. However, in general, many indicators of writing proficiency are not significant, indicating that they are not in a gamified environment. Participants receive insufficient incentives, and the improvement of the learning effect is not ideal.

The fluency, accuracy, syntax, and morphology of the participants of the gamified writing group have been significantly improved. Since the composition topics in the first week and the fifth week are the same, it is convenient to compare the participants' performance at the beginning and end of the experiment. So, the following is the specific example to illustrate the effectiveness of gamification on composition writing of the first week and the fifth week.

TABLE 3: Paired sample test: comparison of the first draft and the fifth draft of the control group.

		Number	Mean	Standard deviation	t value	Sig.
Fluency	Composition for week 1	38	15.04	0.983	-6.305	0.000*
	Composition for week 5	38	17.35	0.954		
Accuracy	Composition for week 1	38	11.08	0.056	-2.069	0.056
	Composition for week 5	38	11.30	0.066		
Syntax	Composition for week 1	38	12.68	0.094	-2.042	0.055
	Composition for week 5	38	12.73	0.096		
Morphology	Composition for week 1	38	13.73	0.052	-1.768	0.105
	Composition for week 5	38	13.74	0.056		

* $p < 0.05$.

3.2.1. Participant 7's First-Week Composition. Nowadays, there is a growing concern over the issue of E-books or paper books. Some people hold the view that E-books are better than paper books, because E-books are cheaper and more convenient than paper books. E-books help us to learn more knowledge at a lower cost. Other people argue that paper books are better than E-books, because paper books are more real and more traditional than E-books. Paper books help us to feel and touch the texture of real papers.

In conclusion, I agree that both aspects should be considered when talking about E-books or paper books. However, I prefer E-books rather than paper books, because I like to learn more knowledge at a lower cost.

3.2.2. Participant 7's Fifth-Week Composition. Currently, it is popular for young individuals to read electronic books online and it has aroused widespread attention among the public. Obviously, it indicates a fact that more attention should be paid to this phenomenon.

When it comes to read e-books, people's views may vary from person to person. On the one hand, some people believe that e-books will replace traditional books, which poses a potential threat to traditional publishing industries.

From my perspective, I take into account that there is no doubt that e-books have its drawbacks as well as virtues. To begin with, e-books will offer us great convenience in our life and it is beneficial to us. So, we could widen our view easier than before. However, provided that we spend too much time on e-books, our vision may be affected. Therefore, we should absorb the benefits of e-books and avoid its drawbacks. Only in this way can we develop better.

The author's first week's composition gives the overall impression that the article's content is insufficient, and the expression needs to be improved urgently. The author wrote down people's opinions in the article, but the explanation and illustration of the opinions were too general, and there were no specific facts and examples to support them. In terms of language, there are evident traces of the use of writing templates. The words used are very elementary, equivalent to the middle school English level. Although there are no obvious grammatical errors, there are several problems with Chinglish expression. As far as the fluency of the article is concerned, the inefficient use of conjunctions and transitional expressions between contexts makes the article less fluent. At the same time, the use of spoken language tends

to be more prominent, which does not meet the requirements of written language.

After completing the 5 weeks of study, the author wrote the second draft on the same topic in the 5th week and made significant progress. The article's length has been increased by 50%, and the content has also been enriched. After expounding the point of view, he could further explain the details of the point of view and use facts to provide details to support his argument. In terms of language expression, the use of language is more natural and there is no obvious trace of the use of a template. The improvement of the use of vocabulary is very undeniable. For example, in the composition of week 1, the author would only use "agree" to express opinions, but in the composition of week 5, the author would use "take into account". For another instance, in the composition of week 1, the author would use "good" to express a good meaning, but in the article of the fifth week, the author would use words such as "beneficial" and "convenient." It can be seen that after 5 weeks of study, the author has a good grasp of advanced English writing vocabulary. The use of advanced English vocabulary has been significantly improved. The willingness to use more complicated and error-prone English vocabulary and the self-confidence in English writing have been significantly improved. As far as the fluency of the whole composition is concerned, compared with the first draft, there are more transitional expressions, such as the use of "to begin with," "so," "however," and "therefore." The composition in the fifth week is smoother and more natural than the composition in the first week. At the same time, the composition in week 5 is better in syntax than the composition in week 1. The number of clauses and inverted sentences is far more than week 1. Finally, in the composition of week 5, the language use is more formal than the composition of week 1, avoiding the tendency of colloquialism. From the perspective of this case, under the influence of gamification, the fluency, accuracy, syntax, or morphology of the articles of the participants has been significantly improved after 5 weeks of study. In terms of the content of the article, the meaning is expressed clearer and the level of the article is relatively clearer. It can be concluded that the level of English composition writing has been improved in all aspects.

In contrast, the participants in the control group only had a significant improvement in fluency. The reason is that after many writing exercises in the second language context,

TABLE 4: Wechsler's signed-rank test of composition for weeks 1 and 2.

	Fluency	Accuracy	Syntax	Morphology
Composition for week 1	17.32	10.65	12.76	12.75
Composition for week 2	18.31	10.86	13.665	14.75
Sig.	0.001	0.060	0.042	0.007

TABLE 5: Wechsler's signed-rank test of composition for weeks 2 and 3.

	Fluency	Accuracy	Syntax	Morphology
Composition for week 2	18.31	10.86	13.665	14.75
Composition for week 3	19.32	12.68	13.677	15.01
Sig.	0.002	0.004	0.775	0.800

TABLE 6: Wechsler's signed-rank test of composition for weeks 3 and 4.

	Fluency	Accuracy	Syntax	Morphology
Composition for week 3	19.32	12.68	13.677	15.01
Composition for week 4	19.56	14.69	13.69	15.24
Sig.	0.112	0.043	0.497	0.257

the subjects will have a more remarkable improvement in the use of language chunks. The improvement in fluency is natural. Although the accuracy, syntax, and morphology have also been somewhat improved, they are not significant.

The improvement of gamified writing group participants' fluency, accuracy, and syntax also illustrates the effect of gamified writing on the effective use of attention resources. Patten (1996) once pointed out that processing language information requires a lot of attention resources and content and form compete with each other in the use of attention resources. Typically, the content will win. In other words, language learners are likely to pay attention to the content of the information at first and only after the ability to process the content continues to improve can they pay attention to the form of the language. Gamification can help learners increase their learning interests, work hard to become familiar with learning tasks, and achieve a balanced development of the content and language. The examples in the article also prove that participant 7's fifth-week composition is better than the first-week composition. Whether it is content or language expression, there has been a substantial improvement. To a certain extent, the results of this study support that gamification can help the transfer of attention resources from content to language form.

3.3. The Best Gamification Degree for Writing. What is the best degree of gamification since the gamification writing group has improved in fluency, accuracy, syntax, and morphology? Does the greater the reward, the better the participants' performance in the gamified writing group? In order to answer this question, from the perspective of fluency, accuracy, syntax, and morphology, the composition of the gamified writing group was compared from the first week to the fifth week and the most optimized reward was found through statistical comparison analysis. The fluency, accuracy, syntax, and morphology data above are compared with

the Wilcoxon signed-rank test. It can be seen (see Table 4) that the fluency, syntax, and morphology of the composition in the second week have improved significantly (fluency: $p = 0.001 < 0.05$; syntax: $p = 0.042 < 0.05$; and lexical: $p = 0.007 < 0.05$); the accuracy is not improved significantly (accuracy: $p = 0.060 > 0.05$). In general, the composition improved significantly in the second week.

Compared with the composition in the second week (see Table 5), the fluency and accuracy of the composition in the third week are significantly improved (fluency: $p = 0.002 < 0.05$; accuracy: $p = 0.004 < 0.05$); syntax and morphology are also improved, but not obvious (syntax: $p = 0.775 > 0.05$; lexical: $p = 0.800 > 0.05$). Overall, the composition in the third week is also progressing.

However, compared with the composition of the fourth week and the third week (see Table 6), in addition to the apparent improvement in accuracy ($p = 0.043 < 0.05$), the improvement of other indicators is relatively weak. At this time, many participants get the highest gamification reward and the positive effect of gamification begins to weaken.

It can be seen that although the median value of the four items in the composition of the fourth week and the fifth week is higher than that of the previous three ones, since the composition of the fourth week, the value of the significance test becomes more extensive and the improvement becomes less and less noticeable. It can be seen that the composition in the third week is the peak of writing performance.

The reason is that by the beginning of the third week of composition, many participants in the gamified writing group won gold medals. When they wrote the fourth-week composition and the fifth-week composition, they could only get the gold medal as the highest reward and the difference only lies in number. The rewards are not qualitatively improved, and the participants' motivation is insufficient. Rewards may also bring negative experiences to users. This phenomenon is called "excessive rationalization" because

happiness is an instant emotion that cannot be accumulated. When the same enjoyment is repeated, the happiness it brings is gradually reduced. If a user is interested in a task but the organizer provides it with predictable rewards unrelated to personal performance, it will reduce their intrinsic motivation (self-determination theory). Specifically, the rules of accepting rewards make participants aware that they are losing autonomy or being controlled, which is usually a negative experience. Through the analysis of the abovementioned data, it can be concluded that when the reward reaches the highest value or the highest level, the effect of gamification teaching is the best. After that, as the degree of experience of the reward decreases, the learning motivation and effects of the learners also decreased.

Some scholars pointed out that the positive teaching effects produced by gamification teaching are likely to be short-term [27] rather than sustainable and long-term effective teaching tools. When the participants are trained and learning to write in a gamified environment, there is a novelty effect at the beginning. But after a short period of time passed, the novelty effect gradually weakened [28], and consequently, the learners' learning motivation and focus began to decrease.

According to the data of the Chaoxing Xuexitong platform for 5 weeks from the beginning to the end of the study, it can be seen from the performance of the participants who participated in the study in the past 5 weeks that the total number of chapters learned in the first week was 216 times and it began to decline in the second week. Then, it gradually increased to the 4th week, reaching 201 times, and in the 5th week, it became 140 times. The abovementioned data can also prove that gamification can quickly increase students' attention and interest in courses but the degree of activity will decrease after a certain period. It can be seen that gamification may not be able to be consistently active in an extended period. In addition, it can be seen from the visit time of the students to the system that the learners of the gamified learning group have a higher proportion in the first three weeks. They will visit the system to view the video before the official start of the course, but from the 4th week to the fifth week, the number of visits before class dropped significantly.

In the questionnaire surveys and interviews with students, several students said that after receiving the gold medal award, they began to feel that the course learning gradually became a little boring. In the beginning, the students experienced the process from bronze medal to silver medal to gold medal. They were indeed very excited. They were more engaged and focused on learning than before [29–31], but after getting the gold medal, they began to feel less motivated. It can be seen that to maintain a higher degree of concentration and allow learners to devote themselves to the learning of writing consistently, the rewards of the game should be based and designed on the arrangement of the entire learning process from low to high and from the start towards the end of the course.

In Chaoxing Xuexing's online system, each course has an online discussion area similar to BBS, where teachers and students can post questions, discuss questions, and give

answers. When the course started, no students used this discussion system effectively. Even after the teacher posted a question in this discussion area, few students gave answers or praised the teacher's questions. After the second week, the activity of the discussion area began to rise and the activity increased by 75% compared with the first week. By the fourth week, the activity of the discussion area reached its peak and the activity of the discussion area began to decrease significantly in the fifth week. The change in activity is consistent with the change in gamification rewards. However, it is worth noting that the abovementioned activity is all students' answers to questions. No students raised questions in the discussion area, and no students discussed in the discussion area. It can be seen that even with the addition of gamification elements, the cooperation and interaction of learners are still insufficient. This is not in line with the research of other scholars. The research of Knutas et al. pointed out that gamification is conducive to promoting students' active collaboration and participation in learning interaction and discussion. However, the learning behavior of learners is more passive in the academic environment where the researcher is located. It can be seen that the degree of participation in the discussion is not only related to gamification but also related to multiple factors such as the cultural atmosphere and educational environment.

3.4. Participants' Attitude towards Gamification in Writing Practice. To be able to assess participants' attitudes towards gamification and study their motivations [32], after the 5-week course, all participants will receive a questionnaire and be asked to answer 10 questions. The design of the questionnaire adopts the Likert scale, which is expressed in the form of a 5-level scale. In the questionnaire, the same questions are involved in writing fluency, accuracy, syntax, and morphology: "I think I have made a significant improvement in this area." And there is the question of attitudes towards gamification: "Is gamification advantageous to the improvement of English writing learning." For the question of being proactive in a gamified environment, the question is "I can learn proactively in a gamified environment." For the question of cooperation, the question is "I can interact and collaborate actively with other people in a gamified environment." For the question of the best degree of reward, the question is "I feel the most fulfilled when I win the gold medal." 80% of the participants fully affirmed the effect of gamification in writing learning. They think that this kind of attempt to learn English writing in a gamified way is significant. In a gamified environment, they can view their composition writing practice more actively and effectively, find out their shortcomings and defects in English writing, and then make improvements. Gamification will significantly improve their English writing abilities.

After the 5-week course is over, 3~5 students will be selected from the gamification writing group at random to be interviewed to determine how the students perceive gamification, whether gamification is exciting, and the effects of the various elements of gamification. Some students think that the sense of accomplishment is most remarkable when they get the gold medal, and when they get the second and

third gold medals, they feel a little tired and the effect of motivation is not as strong as before. However, in general, they recognize the effect of gamification in learning. In addition to gamification elements such as gold medals, in interviews, most of the participants said that rankings [29, 33, 34] have a more substantial stimulating effect on them. When participants compete with other students to achieve higher rankings, they feel more focused on learning. However, a small number of participants said that they do not care about rankings and want to focus on learning the writing content itself and improving the writing level.

In the process of research, we found that the different personalities of interviewees often determine the degree of their focus on gamified courses. In the interview, extroverted students, without exception, expressed their preference for gamified courses. They often completed the learning points of the chapter first and completed the homework repeatedly to get a higher ranking on the leaderboard and lead other studies in the gamified writing group. The winner is rewarded with a badge. But after winning the gold badge, they said that they were no longer as interested as before. It can be concluded that in the use of gamification elements, full coverage of the overall progress of the course should be considered. In addition to badges and level rewards, the gamification element of leaderboards should be paid special attention to.

Some introverted students said that they are not very interested in the various elements of gamification. They think that these gamification elements are just a form and the key is the content of the course learning but they also pay attention to the score ranking. This shows that competing with other learners should be an essential consideration in the design of gamification elements.

The abovementioned summary of students' attitudes can show that students are more acceptable to use gamification to learn English writing. But for the specific use of various gamification elements, we should combine the feedback of teachers and students in the practice of writing teaching and learning to maximize the learning effect of learners.

4. Conclusions and Future Works

4.1. Conclusions. Among the various studies on gamification, this research is the first to explore the role of gamification in English time-limited writing. The data analysis of the Chaoxing Xuexitong online system studies the degree of learners' engagement in writing learning in a gamified environment. According to the analysis of the fluency, accuracy, syntax, and morphology of the learners' five compositions, we will study the effects of gamification on the overall writing abilities and the best degree of gamification. We study learners' attitudes towards gamification with questionnaire surveys and interviews with participants. Research shows that, first of all, gamification can attract learners' interest and improve their English writing skills. Second, in a gamified environment, the effect of gamification is best when the reward reaches the highest level. After that, as the reward experience decreases, the learning effect also decreases. Third, in practical applications, the design of gamification

and its elements must emphasize the feedback from teachers and students. Research has also shown that although gamification has a positive effect on the improvement of English writing in general, it also has some limitations. Therefore, it is necessary to attach importance to the feedback of teachers and students to maximize the effectiveness of gamification.

4.2. Limitations of the Research. This study currently has at least three limitations. First of all, a variety of elements are used in the design of the gamification environment of writing learning, such as grades, points, rankings, and badges. It is not easy to judge which factors have a more significant influence. Whether different game elements have similar effects on learners is still needed to be studied. In this way, when designing game elements in the future, we can select the most effective elements and arrange various elements in the right order. Second, students of different personalities have different attitudes towards gamification. Gamification is very effective in motivating and promoting students who are extroverts. For introverted students, further research is needed on how to improve traditional methods. Third, the participants in this study who happened to meet with the outbreak of the epidemic had to spend two weeks of learning and interaction online. Furthermore, two weeks later, offline activities recovered. Different communication methods from offline may also have different effects on participants' learning mentality and motivation. These factors and questions also need to be further studied and resolved.

4.3. Implications for Future Works. For the impact on future research design, the five-week research period is relatively short but it takes a long time to cultivate and improve the English writing ability. Therefore, extending the research time to one semester or two semesters is recommended. The effects of gamification on English writing ability can be observed more comprehensively. In addition, research samples are also small and the majors of participants are limited to English majors. If we want to increase the universality of the research results, it is recommended to include other majors, expand the scope of participants, and increase the number of participants.

The focus on the design of future gamification systems is to strengthen the sustainability of gamification effects. This research shows that the gamification effect only lasts for a short time, and in the future, we should further study which of the various gamification elements has a long-term effect. Different elements are delivered to participants at different time nodes, and there should be different effects on the duration of the gamification effect. It is possible to maintain learners' enthusiasm with changes in rules and elements. With the study of these issues, the gamification system can be redesigned.

Data Availability

The data used to support the findings of this study are available upon request.

Conflicts of Interest

The authors declare no conflicts of interest.

Authors' Contributions

Zhou Zhihao did the conceptualization, methodology, investigation, and writing-original draft. Zhonggen Yu did the funding acquisition and communication.

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