The Effects of Competitive Gaming Scenarios and Personalized Assistance Strategies on English Vocabulary Learning

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ABSTRACT

English vocabulary is the foundation of English learning. According to information processing theory, recitation helps learners remember and understand English terminology. However, this type of exercise may lead to boredom, anxiety, difficulty concentrating, and other negative effects. This study proposes the integration of competitive gaming with personalized assistance as a means of reducing anxiety and enhancing the degree of immersion, as well as raising the overall effectiveness of the lesson. The board game Monopoly was used as the basis for the design of a vocabulary-focused competitive game. Personalized assistance was provided to help learners study and review new English vocabulary words in an attempt to improve their memorization. A total of 120 students were recruited to serve as participants in the study. Each was randomly assigned to one of four different groups to take part in select English vocabulary activities. The results show that the integration of a competitive gaming scenario with a personalized assistance strategy helped students improve their vocabulary acquisition.

Keywords

English vocabulary learning, Competitive gaming scenario, Personalized assistance strategy, Flow theory, English anxiety

Introduction

Globalization has led to English becoming an international language (Zhang et al., 2017). Vocabulary, pronunciation, and grammar constitute the three primary elements of language, with the accumulation of vocabulary arguably being the most essential. Wilkins (1972) asserted that people are unlikely to successfully express any message without using the appropriate words. The collection and comprehension of words are closely related to overall English ability (Hwang & Wang, 2016). Thus, vocabulary is a focal point when learning English. Those who do not have a sufficient vocabulary cannot effectively understand or communicate. Having a sufficient English vocabulary means storing enough words in long-term memory to achieve a cumulative effect. Atkinson and Shiffrin (1968) used information processing theory to show that learners turn external information and knowledge into long-term memory in three stages: sensory collection, short-term memory, and long-term memory. This process places information or knowledge at the focus of external sensory reception. Thinking processes are initiated after the formation of short-term memory. Next, learners repeatedly review the data, resulting in the formation of long-term memories. Repetitive exercises target the commission of English vocabulary to long-term memory. The repetitive recitation method asks students to memorize English vocabulary by understanding the word itself alongside the word in the mother tongue (Banikowski & Mehring, 1999). However, some have argued that such mechanical and repetitive recitations are likely to lead to boredom, anxiety, distraction, and other negative effects (Mak, 2011; Wu & Huang, 2017).

The current research considered flow theory, also known as immersion theory, a notion first proposed by Csikszentmihalyi (1975). This model describes an empirical flow pattern that causes individuals to become fully involved in the learning process. People who are fully engaged in what they are doing are free from distraction. When learners encounter challenges involving multiple skills and tasks, flow theory explains that the result is the experience of pressure, and even anxiety; however, learners can enter a "heart state" to improve their concentration. Flow theory suggests that concentration is an essential factor, substantially influencing the immersion experience. Studies have indicated that an examinee's degree of focus is significantly related to working memory, which operates when the individual learns to be biased towards a particular memory type; this, in turn, affects learning outcomes (Rensink, 2002). It is worthwhile to note that a reduction in anxiety and increase in the degree of immersion have been shown to improve learners' ability to increase their English vocabulary.

Many studies have indicated that game-based learning can effectively enhance learning motivation, promote educational outcomes, and even reduce anxiety (Young & Wang, 2014). Such games can feature text, voice,

video, or other multimedia features (Prensky, 2001) and be fun, challenging, and ultimately satisfying. Together, these aspects trigger learners' sense of competition and desire for cooperative behaviour in order to obtain rewards. At the same time, flow theory shows that when skills and challenges are properly balanced, students enjoy a higher degree of focus, excitement, and fulfilment, and their level of anxiety is reduced. Because games have established rules and allow students to pursue challenging goals, they facilitate learners entering an immersive state (Kinzie & Joseph, 2008).

When teaching English vocabulary, it is important to determine how different learners can achieve a balance between the challenges they face and their skill level. The current research suggests that achieving this balance depends on the student accessing different auxiliary resources such as personal assistance. Much of the literature has argued that effective individualized learning successfully employs educational resources such that students receive what they need, when they need it (Buckley & Doyle, 2017; Gogoulou et al., 2007). Thus, a personalized assistance strategy would provide the mechanisms and processes required to complete academic tasks in game-like educational scenarios. This would help students meet their goals, achieve proper balance, and further improve their learning experiences and outcomes. Therefore, the research questions driving this study were as follows:

- Could competitive gaming and personalized assistance enhance learning efficiency related to English vocabulary?
- Could competitive gaming and personalized assistance reduce anxiety related to the acquisition of English vocabulary?
- Could competitive gaming and personalized assistance enhance English language learners' degree of immersion?

Literature review

Anxiety state

Anxiety related to foreign language learning is usually attributed to the inability to use second-language skills. Sarason (1984) argued that anxiety resulting from learning a foreign language was a form of social concern that could be explored across three dimensions: cognition, affectation, and behaviour. Horwitz, Horwitz, and Cope (1986) defined anxiety related to foreign language acquisition as follows: in the process of learning a language, this type of anxiety is a subjective tension, apprehension, and worry that will further affect the autonomic nervous response (p. 125). MacIntyre and Gardner (1991) classified anxiety as either trait-based, emotional, or situational unease. Trait anxiety refers to when an individual experiences a stable and long-term state of anxiousness. Emotional anxiety results from an individual's tentative state of worry. Situational anxiety describes a particular situation or environment that causes tension, disruption, and a generally uneasy feeling.

Many studies have suggested that anxiety related to learning a foreign language affects learning outcomes (Mican & Medina, 2017; Yanxia, 2017). Elkhafaifi (2005) indicated that anxiety-ridden students tended to underestimate their ability, which in turn led to lower scores and overall performance. Other studies have shown that emotion is closely related to cognitive ability and overall learning, and positive emotions relevant to learning reinforce this process. Conversely, negative emotions such as anxiety and frustration are not conducive to learning (Hwang et al., 2017; Meyer & Turner, 2006). At the same time, the literature has also suggested that anxiety is an important factor in and has a significant influence on educational outcomes when learning English as a second language (Mak, 2011). Melchor-Couto (2017) found that students in states of high anxiety and/or who suffer from low self-confidence tend to exhibit negative results. In summary, the quality of second language acquisition stems from the learning environment and is related to external factors such as nervousness; the amount of disturbance, uneasiness, or other negative emotions; and other undesirable influences.

Immersion state

Flow theory, also known as immersion theory, was proposed by Csikszentmihalyi (1975) to describe the flow pattern within which individuals become fully involved with, focused on, and subsumed by a particular activity. Individuals become wholly engaged with the immediate activity, and lose elements related to their perception of the outside world. The result is a selfless state of mind, otherwise known as "flow." This flow experience can be enjoyable and even fun; the entire body and mind participate in the activity, allowing the individual to gain a sense of satisfaction without relying on other elements to enhance the experience. The state of mind itself is the reward. Flow theory includes four facets: control, concentration, curiosity, and intrinsic interest (Beard, 2015;

Csikszentmihalyi, 1975). These four sub-constructs can be used to measure learners' flow state when they engage in the learning process.

Skill level and amount of challenge are two additional critical factors in the flow state, because the various different combinations of skills and challenges can produce a wide variety of mental conditions. Only when skills and challenges reach a balance do students achieve the most desirable level of flow. If a student's level of skill allows them to easily surpass the challenge, then the activity will make them feel bored. When the challenge is greater than their level of skill, they may feel anxious. Much of the literature has pointed out that a balance is essential to learning while in the flow state (Cakmak et al., 2015; Challco et al., 2016).

Game-based learning scenario

Many studies have determined that applying educational games to language learning can positively impact academic outcomes and promote students' motivation and interest (Boyle et al., 2016; Oga-Baldwin et al., 2017). Cristea and Fărcaşiu (2015) investigated learning outcomes related to English vocabulary activities, finding that English vocabulary games are one of the most effective learning practices available. Thus, interesting game-based learning is likely to lower anxiety, promote concentration, and improve academic outcomes.

Yip and Kwan (2006) explained that studying vocabulary is often perceived as boring, since students must practice memorizing large bodies of relatively disconnected words. To address this situation, the researchers employed online vocabulary games as a tool to guide students' absorption of English vocabulary. Their study showed that online games did help achieve the designated learning outcomes and promoted longer memory retention in participants. Ashraf, Motlagh, and Salami (2014) also found that using online games could help students acquire English vocabulary by creating a pleasant environment in which learners are eager to compete and/or cooperate. Though there may also be negative effects, games were determined to generally promote a sound cycle of competitiveness.

Personalized assistance strategy

Learning strategies are clear steps or plans developed in an effort to solve educational problems or reach academic goals. They are often applied to the domains of memory, cognition, and emotion (Maranges, Schmeichel, & Baumeister, 2017). Strategies for learning English are employed to assist students with memorizing and absorbing related English knowledge in terms of skills, steps, and actions. They are intended to have a positive influence, helping students to gain, retain, and organize knowledge and ultimately make language learning more relaxing, joyful, and efficient (Oxford, 1990). The advantage of personalized learning is that it helps optimize students' learning processes and assists them in gaining knowledge more effectively. Wu et al. (2014) proposed the development of a ubiquitous personalized English reading system by using RFID technology. This system provided learners with highly realistic scenarios when reading English articles, in part by analysing their current location. This study defined personalized assistance as the provision of scaffolded support to adjust the proportion of questions of different difficulty levels to students' personal learning progress, thus facilitating their learning performance.

System design

Design of the competitive gaming scenario

This study developed a game similar to Monopoly, which served as the competitive activity used to test our theory. Since Monopoly is a well-known board game, this ensured that learners would be likely to understand our game's rules and reduced the possibility of it affecting the research design. The interface was mainly composed of vocabulary tests, movement rolls, travel, and card areas (see Figure 1). The functions of each area are described below.

Vocabulary

In the game, when a learner receives a token, they are allowed to click the dice icon. This causes them to receive six fill-in-the-blank type questions. Three English education experts were asked to discuss this process and eight

college students took this test. Subsequently, it was decided that 15 seconds was the most suitable amount of time to answer the questions. When the learner finishes answering, the system counts the correct number of answers. This determines the number of forward spaces in the learner's roll. Although the game allows learners to control their amount of progress, it does differ from traditional Monopoly. It is only once the learner is familiar with the content and feels highly confident that they are allowed to control their fate and the distance of their roll. This design helps learners master the material. While they wait for their token, they are allowed to review the six questions they have already answered (see Figure 2).
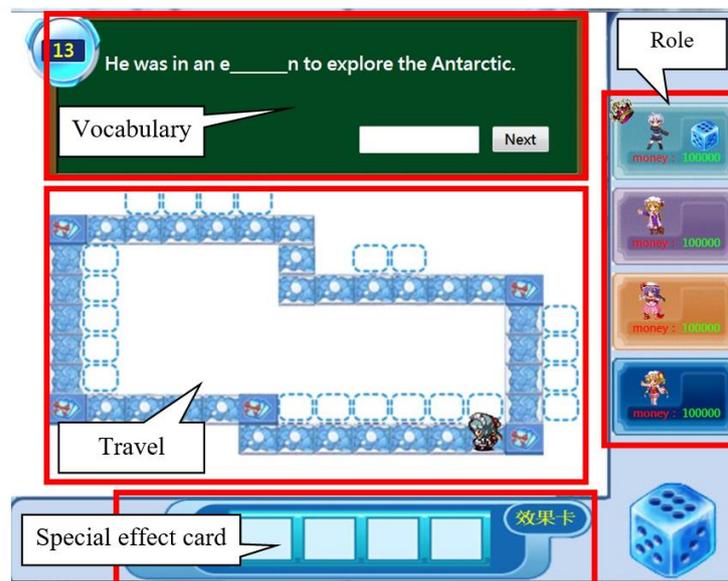

Figure 1. Game interface of English vocabulary

Figure 2. Review interface of English vocabulary

Role

Monopoly is a competitive game played by groups of four people; only one person can operate the game at a time. In our game, the right side of the screen becoming larger indicated that it was the player's turn to proceed. Learners clicked the dice icon to initiate their turn and play the game. In the beginning, each player had $10,000. The amount of the capital increased or decreased in response to specific in-game behaviours. When the game ended, the total amount of the capital determined the victory.

Travel

The game allowed players to move forward along the lattice, according to their number of correct answers. When the game piece landed in a space occupied by no one, the player was able to choose whether or not to buy

the land. If they landed in a space they already owned, they could choose to build a house or upgrade an existing building. Of course, when purchasing a property, building a house, or upgrading an existing structure, the player needed to have and spend the corresponding amount of money. If a player landed on a space occupied with another's assets, they had to pay a fine based on the category and level of that space.

Special effect cards

In order to increase the amount of fun and encourage more interactive group competition, this study designed seven types of special effect cards. These cards allowed for faster upgrading, house destruction, freezing, grabbing, double forward moves, stolen houses, and tax review. Each learner could keep up to four special effect cards and use a maximum of one per round. When the learner answered more than three questions correctly or coincidentally landed on a lattice space with a special effect card, the system randomly gave the player a special effect card. This rewarded students answering questions correctly.

Design of the personalized assistance strategy

The well-known German psychologist Hermann Ebbinghaus (1913) proposed an overlearning approach to education, meaning for a person to master a certain body of knowledge, they must practice to the point of mastery. This learning approach echoes information processing theory, which argues that the making of new knowledge involves the consolidation of old knowledge. A good teaching strategy transfers data from learning materials to learners' long-term memory; therefore, in the process of learning, students not only absorb new knowledge, but also review existing knowledge. Thus, we must pay special attention to the ratio of new to old knowledge. Too much new knowledge can easily lead to cognitive overload, while too much old knowledge may make learners feel bored.

This study created a test bank with 70% unknown or unfamiliar and 30% familiar English vocabulary items, to make adjustments for learning outcomes. Every student had their own vocabulary dataset, and each item was marked as learned or not learned. The system provided questions regarding both unknown and known items, with 70% being unfamiliar and 30% being familiar. This gave students more opportunities to be tested on learning content they did not know. At the same time, they could also review content they had already mastered. Based on the results of each test, the personalized assistance strategy made immediate adjustments. When answered incorrectly, the items were categorized as questions the learners did not know. In the next round's test, the system gained more accurate information based on these knowns and unknowns, ultimately helping learners achieve their goals.

Research methods

This study proposed the integration of competitive games with personalized assistance to explore whether the two together would have significant effects on anxiety, immersion, and learning outcomes. The research model can be found in Figure 3.
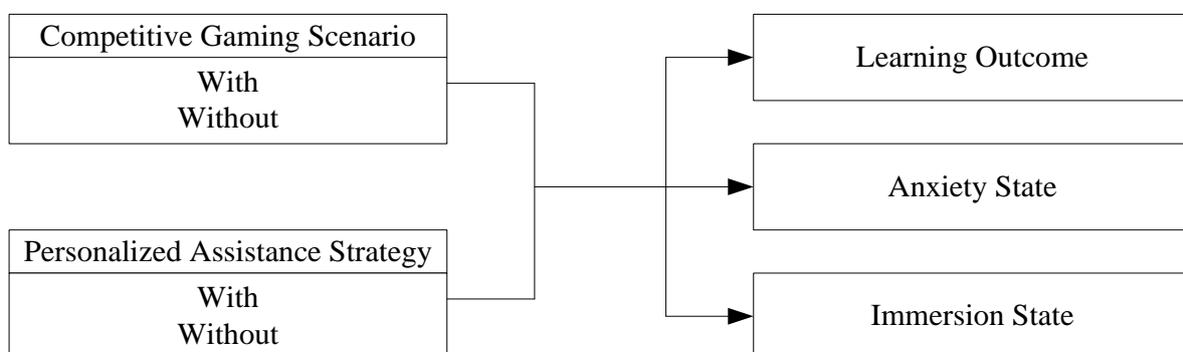

Figure 3. Research framework

A two-way ANOVA design was used to conduct this study and answer the three research questions. The main results and interactive effects of the competitive gaming scenario and personalized assistance strategy on the

degree of immersion, level of anxiety, and resulting learning outcomes were all examined. This research developed four types of sub-learning systems, including: general (GenTE), personalized (PerTE), game-based (GamTE), and game-based and personalized (G&PTE) test bank exercises.

GenTE randomly selected questions from the question bank and provided answers for the students to review but employed no competitive gaming or personalized strategy. PerTE was based on the learners' answers, giving them tailored questions but not requiring them to participate in the competitive game. GamTE positioned four learners in a competitive game, but the tested vocabulary was randomly given (i.e., no personalized assistance). Among these sub-learning systems, G&PTE was the only plan integrating the competitive game with a bespoke learning program. The main content was English vocabulary for students of English as a foreign language. Twenty English vocabulary lists were selected from the intermediate to high levels of the General English Proficiency Test (GEPT) given by the Language Training and Testing Center of Taiwan.

The purpose of this research was to test vocabulary learning outcomes. Therefore, we selected unfamiliar vocabulary items after discussing this topic with experts in the field. In this way, the study was able to avoid the research results being affected by learners' background knowledge. The design used repetitive recitation to access students' long-term memory, in accordance with information processing theory. The materials covered English vocabulary, KK phonetics, parts of speech, English with Chinese sentence examples, and pronunciation. The vocabulary lists and sentences were based on a "winter" or "coldness" context. A total of 20 English vocabulary were designated for the experiment. All the vocabulary used Yahoo's dictionary and VoiceTube as references; professional experts were employed to make any revisions and ensure accuracy. This study recruited 120 volunteers, all university students ranging in age from 19 to 26; in total, there were 62 males and 58 females. The learners were randomly assigned to four different groups of 30 students each. The procedures followed in this experiment are shown in Figure 4.
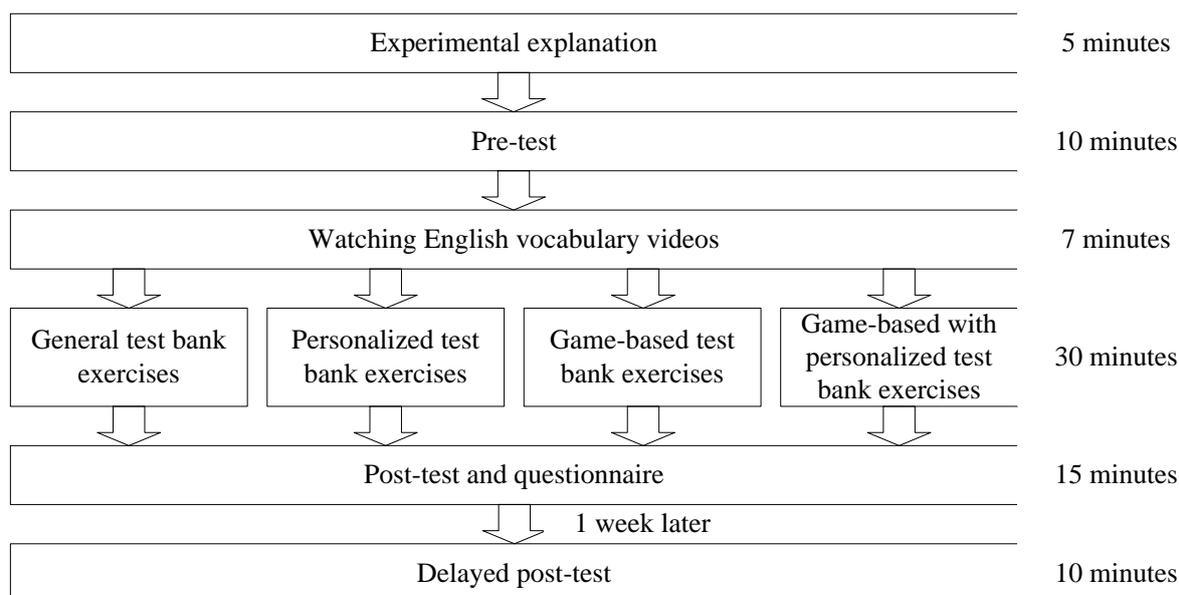

Figure 4. Procedure of the experiment

This study was based on the premise that anxiety from English instruction could be generated by either of two elements: the learning scenario or the learning task. Therefore, two anxiety scales were used to measure the anxiety levels of the participants. The first questionnaire was calibrated according to the situation-trait anxiety scale proposed by Spielberger, Gorsuch, and Lushene (1970). This scale is divided into two parts: situational and trait anxieties. The situational anxiety scale defines anxiety stemming from a learner's sensations at a given time, a short-term emotional response triggered by a particular situation. Therefore, situation anxiety was adopted as an element in this study. There were 20 questions in the test item, and the questionnaire was translated by three experts. The content of its semantic expression was consistent with the experts' validation and internal reliability (Cronbach's $\alpha = 0.92$), meaning that the items in the questionnaire had a good level of reliability (Nunnally, 1978; Spielberger, 1983).

The English reading anxiety scale proposed by Saito, Garza, and Horwitz (1999) was originally a measure of the anxiety generated by learners reading English articles, but this study modified the scale to measure the anxiety experienced in the process of reading English words. The original test items were comprised of 20 statements;

among them were the following: "I usually translate word for word when reading English," and "When I see strange English letters and symbols, I can hardly remember what I read." After discussing all of the items with experts, it was concluded that these two did not fit with the rest of the anxiety test for reading English vocabulary. Thus, we deleted these two questions; the result was that there was a total of 18 items on the questionnaire. For the content of the scale, the translations of the items, modifications, and deletions were accomplished with the assistance of three experts; the result achieved validity. After testing, the internal reliability (Cronbach's α) was 0.86, meaning that the questionnaire items could be considered reliable and well designed (Nunnally, 1978).

The immersion questionnaire for this study and its four constructs were developed by Webster, Trevino, and Ryan (1993); the constructs included the degrees of concentration, control, curiosity, and inner interest. There were 12 questions, and each construct had three sub-questions. The purpose of the immersion scale was to measure the learners' immersion experience within the learning process. The translation of the items in the scale was reviewed by three experts to determine if it was consistent with the experts' understanding, and thus to establish validity.

Results

Analysis of learning outcomes

The first table lists the descriptive statistics for the results of the pre-test, post-test, and delayed post-test. A one-way ANOVA was used to identify significant differences in the pre-test scores among the four different groups. The pre-test had 20 items, each worth 5 points, with a maximum possible score of 100. After the analysis, it was determined that no significant differences existed among the various groups.

Table 1. Descriptive statistics of learning outcomes

Group	Pre-test			Post-test			Delayed post-test		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
GenTE	30	6.5	9.299	30	57.17	24.449	17	47.06	29.051
GamTE	30	2.67	3.651	30	32.83	21.200	15	23.33	18.192
PerTE	30	6.5	8.725	30	63	24.197	19	47.37	29.645
G&PTE	30	4.83	5.645	30	69	20.146	19	51.05	20.040
Total	120	5.125	7.289	120	55.5	26.213	70	43.14	26.610

Note. GenTE: general test bank exercises; GamTE: game-based test bank exercises; PerTE: personalized test bank exercises; and G&PTE: game-based with personalized test bank exercises.

This study used the progress scores from the pre-test and post-test as the learning outcomes. Then, a two-way ANOVA was conducted to measure the main interactive effects of the competitive game and personalized assistance, as shown in Table 2. It was found that the personalized assistance strategy had the main effect on the post-test. Moreover, both it and the competitive gaming scenario had significant interaction effects. In other words, personalized assistance alone had a positive impact on learning outcomes; the improvement in learning outcomes could not be achieved if students only interacted with the competitive game. However, when both were offered, the interactive effect of these two factors facilitated an improvement in learning performance that was superior to when personalized support alone was received.

Table 2. Results of two-way ANOVA on post-test

Source	SS	df	MS	F	Sig.
PAS	11900.208	1	11900.208	27.404	.000***
CGS	1235.208	1	1235.208	2.844	.094
PAS*CGS	5950.208	1	5950.208	13.702	.000***
Error	50372.500	116	434.246		
Total	373975.000	120			

Note. $^*p < .05$, $^{**}p < .01$, $^{***}p < .001$; PAS: Personalized Assistance Strategy, CGS: Competitive Gaming Scenario. All of the following two-way ANOVA notes are the same as this table.

In order to determine if the participants' learning outcomes would change as time went on, a delayed post-test was also conducted. One week after finishing the primary experiment, we administered an additional English vocabulary test. The content of the test was the same as on the post-test, and the results were very similar to those of the initial post-test (see Table 3). The personalized assistance strategy's primary effect was on the post-

test, and there was an interactive effect from the personalized assistance and competitive game. From these results, we concluded that personalized assistance did indeed enhance long-term English vocabulary learning. In addition, it produced an interactive effect on the delayed post-test, when accompanied by the competitive gaming scenario. This shows that the combination of the two elements reflected certain aspects of information processing theory. Learners were not only able to transfer information or knowledge into their short-term memories, but also successfully make the transition to long-term memory.

Table 3. Results of two-way ANOVA on delayed post-test

Source	SS	df	MS	F	Sig.
PAS	3404.583	1	3404.583	5.456	.023*
CGS	1740.616	1	1740.616	2.789	.100
PAS*CGS	3255.821	1	3255.821	5.218	.026*
Error	41183.643	66	623.995		
Total	179150.000	70			

Note. *$p < .05$.

Analysis of anxiety scale

The study also investigated whether competitive gaming and personalized assistance influenced anxiety levels in English vocabulary learning. To explore these factors, we used the game developed for this research and two English reading anxiety scales. Three experts were called upon to assist with the translation and deletion of scale items to ensure that the content of the scale was comprised of consistent semantic expressions. Using a two-way ANOVA, the survey adopted a five-point scale. Descriptive statistics of the results for the four groups can be found in Table 4.

Table 4. Descriptive statistics of anxiety scale

Group	n	Situation anxiety		English reading anxiety	
		Mean	SD	Mean	SD
GenTE	30	56.97	11.14	52.7	8.887
GamTE	30	52.5	12.599	50.2	11.961
PerTE	30	54.7	11.914	52.87	10.641
G&PTE	30	48.8	13.942	46.17	11.516
Total	120	53.24	12.65	50.48	11.019

The competitive gaming scenario indicated a significant difference on both the situational and English reading anxiety scales, as shown in Tables 5 and 6, respectively. There was no interaction between the competitive gaming scenario and personalized assistance strategy. These results show that competitive gaming can be used to help learners reduce their situational and English reading anxiety levels.

Table 5. Results of two-way ANOVA on situation anxiety

Source	SS	df	MS	F	Sig.
PAS	267.008	1	267.008	1.725	.192
CGS	806.008	1	806.008	5.207	.024*
PAS*CGS	15.408	1	15.408	0.100	.753
Error	17955.567	116	154.789		
Total	359205.000	120			

Note. *$p < .05$.

Table 6. Results of two-way ANOVA on English reading anxiety

Source	SS	df	MS	F	Sig.
PAS	112.133	1	112.133	0.959	.330
CGS	634.800	1	634.800	5.427	.022*
PAS*CGS	132.300	1	132.300	1.131	.290
Error	13568.733	116	116.972		
Total	320276.000	120			

Note. *$p < .05$.

Analysis of the immersion scale

This research used an immersion scale with the following four facets: concentration, degree of control, curiosity, and inner interest. With the construct of concentration, there was no interaction between the personalized assistance strategy and competitive gaming scenario among any of the four groups. However, the degree of control displayed significant interactions among the four groups for both the competitive gaming scenario and personalized assistance strategy. Nevertheless, the two elements did not display any interaction. The results of the analysis of the curiosity construct showed a significant difference among the four groups in the competitive gaming scenario, but no significant difference with the element of personalized assistance. Neither was there an interaction with curiosity by either of these two factors. The results of the analysis of the inner interest construct showed that there were significant differences with the competitive gaming scenario and personalized assistance strategy among the four groups. However, there was no interaction between these two elements. All relevant statistical descriptions can be found in Tables 7 to 11.

Table 7. Descriptive statistics of immersion scale

Group	n	Concentration		Control		Curiosity		Inner interest	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
GenTE	30	9.2	2.772	8.47	2.063	8.23	2.622	7.97	2.141
GamTE	30	9.7	2.693	10.20	2.235	10.07	3.084	10.30	2.756
PerTE	30	10.43	2.873	10.37	2.025	9.37	2.526	10.00	2.393
G&PTE	30	9.43	2.967	11.03	2.059	10.80	2.618	11.83	2.036
Total	120	9.69	2.831	10.02	2.279	9.62	2.850	10.03	2.699

Table 8. Results of two-way ANOVA on concentration

Source	SS	df	MS	F	Sig.
PAS	7.008	1	7.008	0.876	.351
CGS	1.875	1	1.875	0.234	.629
PAS*CGS	16.875	1	16.875	2.110	.149
Error	927.833	116	7.999		
Total	320276.000	120			

Table 9. Results of two-way ANOVA on control

Source	SS	df	MS	F	Sig.
PAS	56.033	1	56.033	12.740	.001**
CGS	43.200	1	43.200	9.822	.002**
PAS*CGS	8.533	1	8.533	1.940	.166
Error	510.200	116	4.398		
Total	12658.000	120			

Note. **$p < .01$.

Table 10. Results of two-way ANOVA on curiosity

Source	SS	df	MS	F	Sig.
PAS	26.133	1	26.133	3.529	.063
CGS	80.033	1	80.033	10.808	.001**
PAS*CGS	1.200	1	1.200	0.162	.688
Error	859.000	116	4.398		
Total	12064.000	120			

Note. **$p < .01$.

Table 11. Results of two-way ANOVA on inner interest

Source	SS	df	MS	F	Sig.
PAS	95.408	1	95.408	17.308	.000***
CGS	130.208	1	130.208	23.621	.000***
PAS*CGS	1.875	1	1.875	0.340	.561
Error	639.433	116	5.512		
Total	12927.000	120			

Note. ***$p < .001$.

Discussion

The effects of the competitive gaming scenario and personalized assistance strategy on learning outcomes related to English vocabulary

In this research, the amount of progress on the pre- and post-tests were regarded as the learning outcomes. Games can significantly improve a competitive environment and state of immersion (Chang et al., 2017). The main impetus for an immersed state is a balance of techniques and challenges. Some researchers have argued that techniques and challenges most easily reach a balanced result at a low-skill threshold and less challenging state. Thus, the balanced immersion state for the game-based test bank exercise group was developed using low-level techniques and challenges. Yet learners can become bored or disinterested, fail to become immersed, and eventually lose focus on an activity (Hamari & Koivisto, 2014). In our experiment, this led to no successful learning outcomes and a slow growth in English vocabulary skills; it did not drive the sound circle of skills and challenges or balance high skills.

This study suggests that instructors should effectively allocate learning resources when time is limited by optimizing the testing process. In our learning strategy, students had a 70% chance of testing English vocabulary that they did not already know and a 30% chance of encountering vocabulary with which they were already familiar. This analysis shows that a personalized assistance strategy can effectively help students acquire English vocabulary knowledge. Moreover, it was determined from the delayed measurement that such a strategy could have a long-term impact on learning outcomes. Russell (2001) analyzed a large number of studies and found that new information technology may not directly have a significant positive impact on learning outcomes, but "no significant difference" also has an important meaning. If we expect that new technologies have substantial effects on learning performance, we should pay more attention to the course design, students' needs/responses, and individual differences. The findings of this study are consistent with Russell's argument in which competitive games will not affect learning outcomes alone; however, the integration of personalized strategies into the game design does help learners enjoy the learning process and strengthen and maintain effectiveness.

The influence of the competitive game and personalized assistance on anxiety associated with learning English vocabulary

It was determined that competitive games could significantly reduce situational and English reading anxieties. According to game-scenario literature, games allow learners to pursue challenging goals by following established rules, thereby enticing them to become interested and immersed in the learning activity. Thus, the process can easily create a low-anxiety educational environment (Mavridis & Tsiatsos, 2017). The best results have been produced by group-based competitive games, rather than a personal gaming environment. An optimized learning process allocates the appropriate resources so that learners can more efficiently obtain required knowledge. Therefore, this study argues that personalized assistance strategies should be used along with competitive games to offer more useful forms of play.

The influence of the competitive gaming scenario and personalized assistance strategy on immersion associated with learning English vocabulary

Students tend to be focused on the learning process. Much of the literature has indicated that game theory is closely related to the immersion state. An immersed state is one in which an individual completely focuses on an activity. The main element necessary to yield a flow state is a balance between skill level and challenge. Game-based learning allows students to pursue challenging goals within established rules by using their personal skills. Thus, game-based learning should have a significant impact on immersion. The two-way ANOVA analysis showed that the personalized assistance strategy had a significant impact on controlling two facets: immersion level and intrinsic interest. This demonstrates that personalized assistance could help students improve within an established learning system and assist them in exerting a degree of control; it may also be an improvement over traditional methods in that it could generate a higher level of inner interest.

Conclusion

This research used an experimental design for data collection and analysis and verified the results of the experiment via a variety of statistical methods. There was a significant difference in terms of reducing anxiety

when using a competitive gaming scenario to learn English vocabulary. This study divided the measure into situational and English reading anxieties. The results showed a substantial reduction in both types of anxiety during the competitive game designed to teach English vocabulary. Further analysis of the situational anxiety component indicated that it mainly stemmed from facets of the positive state. Learners' anxiety from reading English primarily emerged from the negative state. Therefore, this research suggests that using competitive games will reduce situational anxiety by improving the positive state, and also will directly reduce the negative state, thus diminishing English reading anxiety. Additionally, competitive gaming had a significant effect on English vocabulary acquisition by enhancing the amount of control, curiosity, and intrinsic interest. Kinzie and Joseph (2008) believed that games would offer challenges that could be achieved by following existing rules, so learners could immerse themselves and become more interested in the activity. According to the results of this study, it seems that competitive gaming did indeed improve the level of inner interest in the learning process.

According to information processing theory, converting English vocabulary into short-term memory requires a record of external senses, while converting short-term recollections into long-term memory entails a process of review. To improve learning outcomes by converting English vocabulary into long-term memory in a limited amount of time, study and practice periods had to be properly allocated between short and long-term memory. This research found that after the initial background knowledge was acquired, students needed to spend half of the original learning time reviewing; this strengthened the level of consolidation. This study designed a personal assistance strategy that used a 70% conversion of short-term memory for learning new knowledge, and 30% conversion of long-term memory for review. Due to our findings, we believe that this personalized assistance strategy will effectively improve learning outcomes in students of English vocabulary.

In conclusion, the competitive gaming scenario and personalized assistance strategy for learning English vocabulary significantly interacted to enhance learning effectiveness. It is clear that individualized assistance had a significant effect on learning and joining it with the competitive game further promoted this interaction. For students of English vocabulary, this study suggests that personalized assistance strategies will effectively improve English vocabulary skills, especially in competitive gaming scenarios. Moreover, it will increase students' competitiveness with other learners. Ultimately, this should yield a sound circle in which all find a balance between high skill and challenge levels. Therefore, competitive gaming scenarios and personalized assistance strategies will together improve English vocabulary acquisition.

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