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Effectiveness of Gamified Cooperation and Competition Strategies in a Blended Learning Environment for Developing EFL Business Writing Skills for TVET Learners

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Abstract

This research investigated the effectiveness of gamified blended learning environments in fostering EFL writing skills among technical and vocational education and training (TVET) trainees in Saudi Arabia. It compared three distinct learning strategies achieved through gamification design in a blended delivery mode: gamified cooperation, gamified competition, and gamified cooperation-competition. Each strategy leveraged a specific category of gamification features that evoke different goal structures: cooperation, competition, or a combination of both. A quasi-experimental design with a pre-test and post-test was employed. Forty-five trainees were purposively selected and randomly assigned to three groups, each receiving instruction using a different gamified blended learning program for teaching business writing. The findings revealed significant improvement in English as a Foreign language business writing skills for all

three groups. However, a one-way ANOVA and post-hoc Tukey HSD test indicated that the gamified cooperation-competition strategy yielded the greatest improvement compared to the gamified cooperation and gamified competition strategies alone. This suggests that a combination of cooperative and competitive elements within a gamified blended learning environment might be the most effective approach for enhancing English as a Foreign language business writing skills among Technical and Vocational Training and Education learners.

Keywords: Gamification, gamified cooperation, gamified competition, gamified blended learning, Business Writing, Technical and Vocational Training and Education

Introduction

The Importance of English Language Skills in TVET

In today's knowledge-based economy, scientific expertise coupled with practical application is paramount for sustainable development. Technical and Vocational Education and Training (TVET) systems play a critical role in achieving this by fostering the necessary skills in their graduates (World Bank, 2019). Transforming individuals from unskilled individuals into a competent workforce is essential for national growth. However, for TVET graduates in non-native English-speaking countries, effective communication in English is increasingly becoming a prerequisite for employment across various sectors. As a result, many professionals with limited English proficiency are seeking vocational English language courses that combine language acquisition with job-specific skill development (Tsui & Ng, 2000).

While the importance of integrating English writing skills into TVET curricula is widely acknowledged, research indicates that many graduates lack adequate preparation. For instance, The National Commission on Writing (NCW) (2004) found that a significant portion of employers reported only one-third of their current and new employees possessed essential writing skills.

To address these challenges and improve the effectiveness of educational and training institutions, the adoption of innovative learning solutions like e-learning is gaining traction. Among these solutions, blended learning offers a promising approach by fostering "learning communities, extending training events, providing follow-up resources, and delivering supplemental course materials" (Bonk, Kim, & Zeng, 2006, p. 560). Blended learning capitalizes on the strengths of both online and face-to-face instruction, providing a well-rounded educational experience.

Since the beginning of the second decade of the 21st century, gamification has earned a great research interest as a driving force for learners' participation in and motivation towards the learning process helping them achieve the targeted learning outcomes. While goal orientation differentiates gamification from games, research suggests a gap in understanding the impact of various goal structures employed in gamification, including cooperation, competition, and inter-team competition (Rapp et al., 2019). Several studies (Chen & Pu, 2014; Hamari, 2013; Lee et al., 2013; Massung et al., 2013; Mekler et al., 2013) highlight significant differences in the effectiveness of gamification elements like leaderboards, badges, and team challenges, depending on whether they promote competition, cooperation, or individualistic learning styles.

Depending on the "Social Interdependence" theory (Johnson, 2003), Gamification features are classified by Morschheuser, Maedche, & Walter (2017) into four categories; each category can invoke different structures of goals (victory conditions). This is supported by the theory of "Goal-setting" of (Locke and Latham, 1990). These four categories are as follows:

Individualistic Gamification Features: Here, the learners are provided with motivational affordances to gameful experiences, but no interdependence is found between goals of individuals.

Cooperative Gamification Features: The learners are provided with motivational affordances to gameful experiences using goal structures which create positive goal interdependence.

Competitive Gamification Features: The learners are provided with motivational affordances to gameful experiences using goal structures which create negative goal interdependence.

Cooperative-Competitive Gamification Features: The learners are provided with motivational affordances to gameful experiences based on group work. There is positive goal interdependence in the group itself and negative goal interdependence between different groups.

This research stems from the researcher's recurring observation of the persistent weakness in the academic achievement of trainees during his work as an English language trainer at Zamil Higher Institute for Industrial Training (ZHIIT) in Saudi Arabia, particularly regarding their English writing skills. This research seeks to build upon this existing knowledge by exploring the specific impact of cooperation and competition-based gamification strategies within a blended learning environment on EFL writing skills development among TVET learners. Specifically, this research focused specifically on:

Identifying the essential EFL business writing skills required by TVET graduates.

Designing and implementing a blended learning environment using three distinct gamified strategies:

Gamified Cooperation (*intragroup cooperation*): This strategy leverages gamification elements that offer motivational affordances using goal structures to promote positive interdependence between learners' goals, fostering collaboration and teamwork (e.g., team challenges).

Gamified Competition: This strategy utilizes elements that create negative interdependence between learners' goals, promoting individual competition (e.g., leaderboards).

Gamified Cooperation-Competition (*intergroup competition*): This strategy combines elements of both cooperation and competition, fostering teamwork within groups while maintaining competition between groups (e.g., competitive team challenges).

Evaluating the effectiveness of each gamified strategy in enhancing learners' academic achievement in EFL business writing skills.

Comparing the effectiveness of these three strategies to identify the most effective approach for improving the writing skills of TVET learners.

Research Question

The Main question of this research project was "What is the effectiveness of gamified blended environment strategies in developing the EFL business writing skills for technical and vocational learners?"

Methods

Research Methodology

This research adopted a quasi-experimental methodology, employing a pretest-post-test design to evaluate the effectiveness of various training program designs. Through rigorous analysis of the collected data, the study aims to ascertain the effectiveness of each instructional strategy in achieving the desired learning outcomes. This approach enables a comparative evaluation of the impact of different training methods, offering valuable insights into their respective strengths and weaknesses. By systematically examining the outcomes of each experimental group, the study aims to provide evidence-based recommendations for optimizing training program designs and enhancing learning outcomes in the targeted context. The research variables were represented by:

The *independent* variables are three gamified blended learning strategies.
The *dependent* variable is the skill of English writing.

The descriptive methodology was also adopted as the researcher reviewed the related previous literature. This helped provide a comprehensive understanding of the existing body of knowledge and

identifies gaps or areas for further investigation. Additionally, descriptive methodology allowed for the systematic organization and analysis of information, facilitating the synthesis of key themes, trends, and patterns.

The Experimental Design

This research began by conducting pre-tests on a substantial number of trainees to establish baseline proficiency levels in English writing. National Industrial Training Institute (NITI) – one of the top TVET institutions in Saudi Arabia – was randomly chosen to conduct the research experiment. Subsequently, a sample of 45 trainees in 3 groups (15 trainees in each) matched in English writing proficiency, were selected, and randomly assigned to three distinct training programs. Following the sample assignment, each experimental group underwent instruction using a unique gamified blended learning strategy tailored to their respective program based on the intended gamification intervention. After completing the training, all three groups underwent post-testing to evaluate the effectiveness of the implemented strategies. The following table shows the experimental design:

Table 1: The Experimental Design

Pretest	**Groups**	**Treatment**	**Posttest**
Achievement Test (EFL Business writing test)	A	Cooperative Gamified Blended Environment	Achievement Test (EFL Business writing test)
	B	Competitive Gamified Blended Environment	
	C	Cooperative-competitive Gamified Blended Environment	

The three versions of the e-learning program were designed using the same blended learning model which is Flipped Rotation where students need to complete online lectures or assignments at home as an introductory for the next class, followed by in-class discussions and activities. The only difference was the factor of the gamification approach which is explained as follows:

Training Program Version 1 (Group A): The research group A was broken into 3 subgroups with 5 trainees in each. Their training program was gamified using cooperative elements that encourage collective goals or challenges that require cooperation among each subgroup members to accomplish.

Training Program Version 2 (Group B): Trainees of group B studied using a training program that was gamified using elements that offer motivational affordances that promote negative interdependence between goals (e.g., leaderboard).

Training Program Version 3 (Group C): Group C was broken into 3 subgroups with 5 trainees in each. Their learning program was gamified using cooperative-competitive elements that foster positive interdependence within each subgroup and negative interdependence between each subgroup.

The Teaching and Learning Methods

Recognizing the focus on adult learners in this research, the authors implemented a suite of teaching methods aligned with andragogical principles, emphasizing self-directed learning, practical application, and real-life relevance. Task-Based Language Teaching (TBLT) served as the core method, with instructors designing engaging tasks that leverage learners' existing knowledge. A flipped classroom model complemented TBLT, providing pre-class online lectures for independent exploration of concepts, followed by in-class discussions and collaborative activities. Finally, gamification elements were integrated to evoke different goal-structures - cooperation, competition, and a blend of both - to create a dynamic and immersive learning environment that incentivized active participation and a desire to excel among the trainees.

Developing the Treatment Materials

After developing and validating the list of business wring skills and subskills as well as defining the learning objectives, different e-learning and gamification implementation design models were reviewed, and among the standout options was the Gamified E-Learning Design (GED) model developed by Malas and Hamtini (2016). This model aims to integrate gamification processes along with e-learning system development stages. It offers a structured approach to integrating gamification principles into e-learning environments. The Gamified e-Learning Design (GED) Model consists of five key stages as shown below:

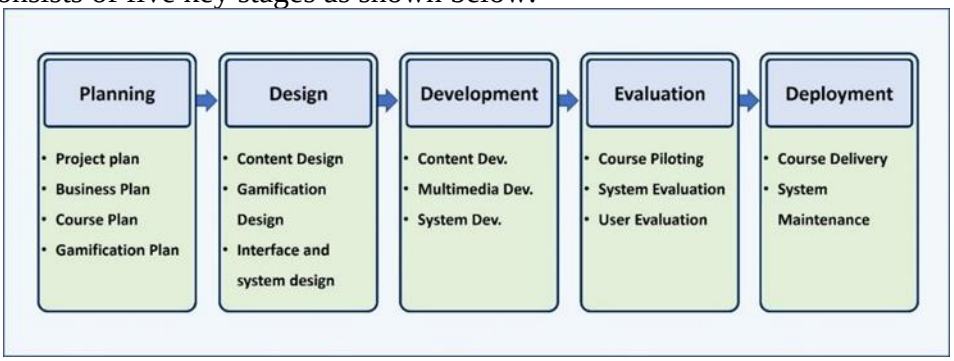

Figure 1: A Gamified e-Learning Design (GED) Model
(Adapted from Malas and Hamtini, 2016)

As guided by GED model and in the light of the list of skills and the learning objectives, the researcher designed and developed the gamified learning environment that included a training program delivered in in-class sessions and using an online learning platform (Lincademy.com). Below is the delivery plan that clearly highlights the blended delivery mode (The lessons were named levels and the lesson topics were named missions):

Table 2: The Delivery Design of the Training Program

Level (Module)	**Delivery Mode**	
	Online	In-Person
Level 1 (Mission 1)		Program Intro + Online system Training in Labs *Day 1*
Level 1 (Missions 2 & 3)	Online Videos + Mastery Check *Day 1 (Opens in the evening)*	Discussions + Activities *Day 2*
Level 2 (Missions 1, 2 & 3)	Online Videos + Mastery Check *Day 2 (Opens in the evening)*	Discussions + Activities *Day 3*
Level 3 (Missions 1, 2 & 3)	Online Videos + Mastery Check *Day 3 (Opens in the evening)*	Discussions + Activities *Day 4*
Level 4 (Missions 1, 2 & 3)	Online Videos + Mastery Check *Day 4 (Opens in the evening)*	Discussions + Activities *Day 5*
Level 5 (Missions 1, 2 & 3)	Online Videos + Mastery Check *Day 5 (Opens in the evening)*	Discussions + Activities *Day 6*
Level 6 (Missions 1, 2 & 3)	Online Videos + Mastery Check *Day 6 (Opens in the evening)*	Discussions + Activities *Day 7*
Level 7 (Summary & Wrapping Up)	Online Videos + Mastery Check *Day 7 (Opens in the evening)*	Discussions + Activities *Day 8*

The learning materials consisted of video-based lectures and quizzes that were delivered online using the gamified online learning platform. It also consisted of handouts with task-based activities for the in-person sessions.

The training program was the same for the three groups except for the gamification elements used that was different based on the gamification design for each group. The table below shows the gamification design based on the three different versions of the learning environment:

Table 3: The Gamification Design

Gamification Strategy Intended User Behaviour	**Elements**	**Area of Application**
Cooperation	**Instructions (Rules)** *Learning progression Instructions focusing on intra-group cooperation*	During in-class activities
	Collaborative Challenges *In-class tasks of group activities such as group writing and peer review* *Online challenging discussions*	In-class activities social group forum

	Group Badge *(Based on the cooperation level and collective marks of quizzes & tasks of group members: [No Badge – 1st Level (Good) – 2nd Level (Very Good), 3rd Level (Excellent)]*	A widget in the online social group
	Group Progression Indicator *Chart showing the learning progression of the whole group*	A widget in the online social group
	Collective Feedback *(The instructor's feedback to the group)*	In-class & Online
Competition	**Instructions (Rules)** *Learning progression Instructions focusing on individual competition*	During in-class activities
	Leaderboard *The top 5 learners based on quizzes results – If not in the list, the position is shown at the bottom*	A widget in the online social group
	Individual Feedback	Online quizzes
Cooperation-Competition	**Instructions (Rules)** *Learning progression Instructions focusing on intra-group cooperation and inter-group competition*	In-class activities
	Competitive Team Challenges *In-class challenging tasks that use peer review within teams and inter-team ranking* *Online challenging discussions*	In-class activities
	Team Comparison Chart *(Comparing the learning progression level of each group team based on the cooperation level and collective marks of quizzes & tasks of each team)*	A widget in the online social group
	Collective Feedback *(The instructor's feedback to the group teams)*	In-class & Online

The online learning platform necessitated gamification tools to enhance user engagement and social interaction and recognition. The platform was designed so that it can provide the following services:

- Learning and development using on-demand online course marketplace (Free and Paid) like Udemy and Coursera.
- Networking and connecting like other professional platforms such as LinkedIn.
- Discussing career and learning (Social learning) using social groups and forums

Below are screenshots of different areas in the online learning platform (lincademy.com)

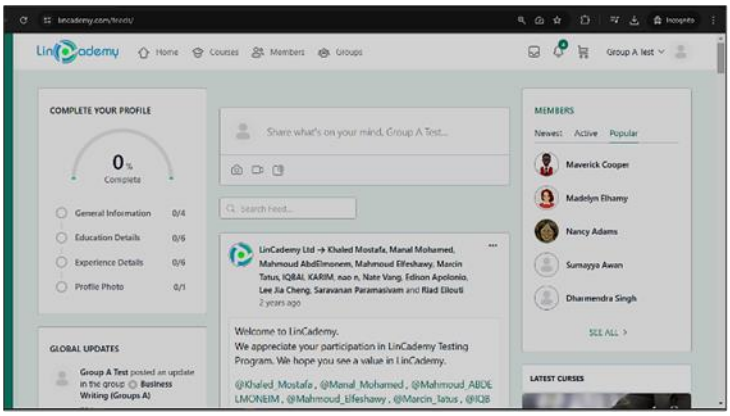

Figure 2: A screenshot of the Activity Feed (LinCademy Homepage)

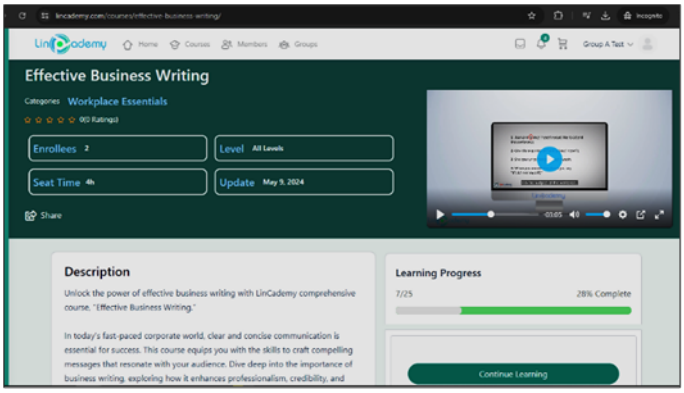

Figure 3: A screenshot of the course single page on LinCademy

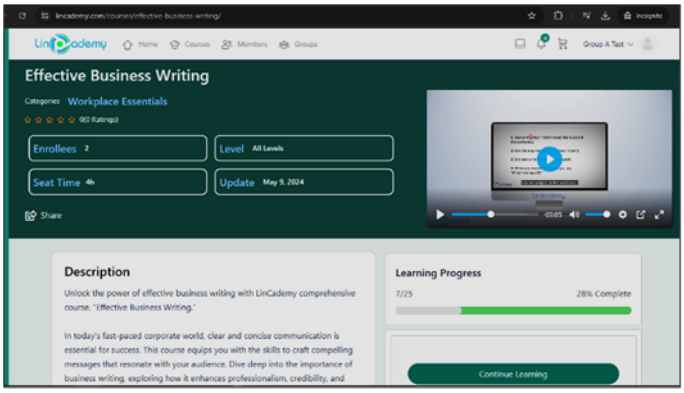

Figure 4: A screenshot of the lesson single page on LinCademy

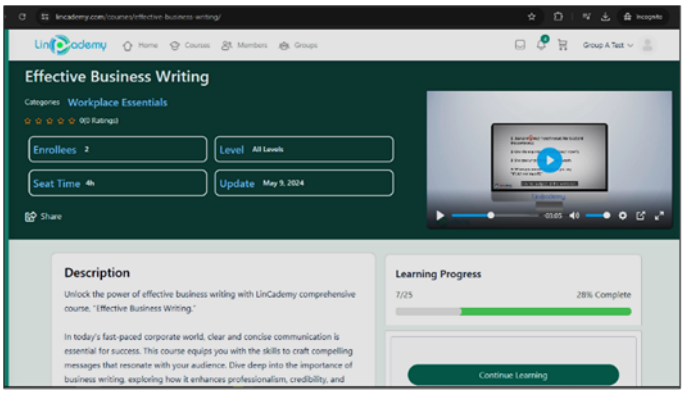

Figure 5: A screenshot of a Social Group with a Gamified Cooperation Element

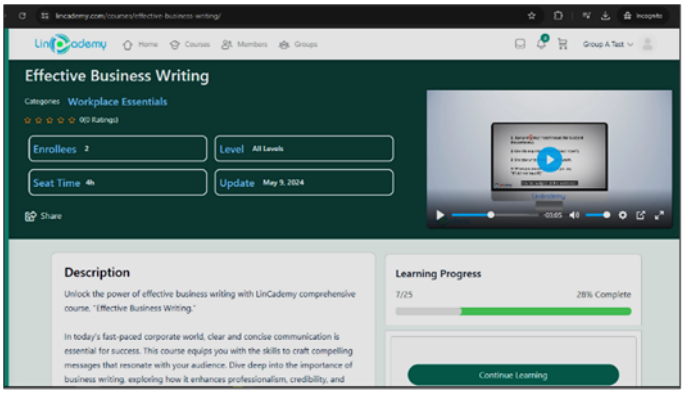

Figure 6: A screenshot of a Social Group with a Gamified Competition Element

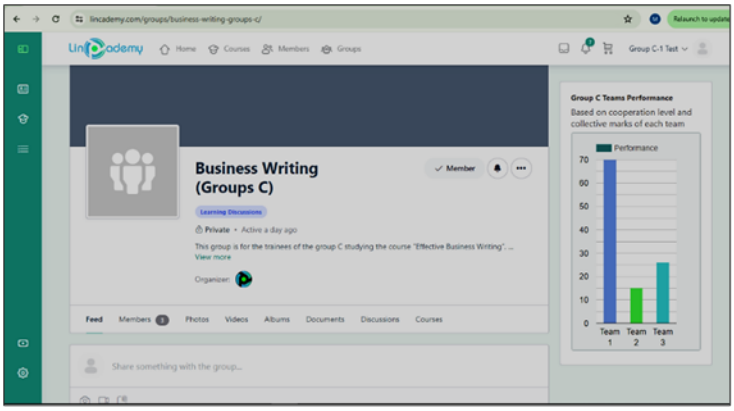

Figure 7: A screenshot of a Social Group with a Gamified Cooperation-Competition Element

The training program and the learning manageemnt system were validated by requesting a group of arbitrators, jury members, experts, and specialists to evaluete them, and the their suggestions were applied.

Developing the Research Instrument

A business writing achievement test of 2 versions and a marking rubric were developed. To ensure the "Business Writing Achievement Test" accurately measured EFL business writing skills, the researcher implemented a two-step validation process. First, subject matter experts reviewed the test items for alignment with learning objectives and clarity, leading to minor revisions. Second, the researcher employed statistical methods and a pilot sample to assess the test's reliability. This analysis yielded a high Cronbach's Alpha coefficient, indicating the test items consistently measured the targeted skills and produced dependable results for interpreting trainee performance.

The Experiment Deployment

The experiment deployment phase consisted of three stages. First, a preparation stage involved obtaining approvals, setting up the online learning platform with content, quizzes, and group-specific sign-up links, scheduling face-to-face sessions, and orienting participants. Second, a pre-application stage involved administering a Business Writing Achievement test to assess proficiency and assign participants to groups. Finally, conducting the experiment stage involved delivering the program using the three different gamified blended learning strategies. This stage included online assessments for self-evaluation, security measures for the online platform, and technical support for trainees. The training program was conducted during the third quarter of the academic year 2023/2024, and the data was collected.

Results

To evaluate the effectiveness of each one of the target learning strategies and to find out the most effective one, the researcher analyzed and calculated the collected data statistically using the Statistical Package for Social Sciences (SPSS) (V. 21). The following statistical methods were used:

Evaluating the effectiveness of each learning strategy

Descriptive Statistics: The researcher first used descriptive statistics to calculate the mean and standard deviation of the pre-test and post-test scores for the gamified cooperation strategy. This provides an initial overview of the data and shows the changes in mean scores.

Tests of Normality: The Shapiro-Wilk test was used to check if the pre-test and post-test scores are normally distributed. This is important to validate the use of parametric tests such as the paired samples t-test.

Paired Samples t-test: This test was conducted to compare the mean scores of the pre-test and post-test within the same group of learners to determine if there is a statistically significant difference in their performance before and after the intervention.

Finding out the most effective learning strategy

1) *Descriptive Statistics:* The researcher first used descriptive statistics to compare the mean values of the three strategies; the highest mean value, the best.
2) *Test of Homogeneity of Variances:* Before conducting ANOVA (Analysis of Variance) test, the researcher needed to ensure equal variances between the three groups, which is an assumption for ANOVA. This was done using Levene's Test
3) *Conducting ANOVA test:* The one-way ANOVA was conducted to examine if there were significant differences in academic achievement among the different teaching strategies.
4) *Post-hoc Analysis:* Post-hoc Tukey tests were conducted to compare the mean differences in improvement scores between different strategies.

The below tables show the statistics findings:

A-1: Descriptive Statistics:

Table 4: Descriptive Statistics for Pre-Test and Post-Test Scores of the three strategies

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Gamified Cooperation Strategy pre-test	15	6,00	24,00	15,4667	4,32380
Gamified Cooperation Strategy post-test	15	25,00	48,00	34,7333	6,69186
Gamified Competition Strategy Pre-test	15	4,00	26,00	15,2000	4,67822
Gamified Competition Strategy Post-test	15	34,00	49,00	39,2000	4,63219
Gamified Cooperation-Competition Strategy pre-test	15	5,00	26,00	14,4000	4,80773
Gamified Cooperation-Competition Strategy post-test	15	36,00	55,00	44,4667	5,57887

A-2: Tests of Normality

Table 5: Tests of Normality for All Strategies

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Gamified Cooperative Strategy pre-test	0,140	15	0,200*	0,974	15	0,914
Gamified Cooperative Strategy post-test	0,202	15	0,100	0,953	15	0,578
Gamified Competitive Strategy Pre-test	0,208	15	0,080	0,908	15	0,126
Gamified Competitive Strategy Post-test	0,216	15	0,058	0,894	15	0,077
Gamified Cooperation-Competition Strategy pre-test	0,175	15	0,200*	0,943	15	0,424
Gamified Cooperation-Competition Strategy post-test	0,143	15	0,200*	0,942	15	0,409

A-3: Paired Samples t-test

Table 6: Paired Samples Statistics for the Cooperation Group

Paired Samples Statistics				
	Mean	N	Std. Deviation	Std. Error Mean
Gamified Cooperative Strategy Post-test	34,7333	15	6,69186	1,72783
Gamified Cooperative Strategy Pre-test	15,4667	15	4,32380	1,11640

Table 7: Paired Samples Test for the Cooperation Group

Paired Samples Test (Gamified Cooperation Post-test - Gamified Cooperation Pre-test)							
Paired Differences					t	df	Sig. (2-tailed)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
19,26667	3,36933	0,86996	17,40079	21,13254	22,147	14	0,000

Table 10: Paired Samples Statistics for the Competitive Group

Paired Samples Statistics				
	Mean	N	Std. Deviation	Std. Error Mean
Gamified Competitive Strategy Post-test	39,2000	15	4,63219	1,19603
Gamified Competitive Strategy Pre-test	15,2000	15	4,67822	1,20791

Table 11: Paired Samples Test for the Competitive Group

Paired Samples Test (Gamified Competition Post-test - Gamified Competition Pre-test)							
Paired Differences					t	df	Sig. (2-tailed)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
24,00000	2,64575	0,68313	22,53483	25,46517	35,132	14	0,000

Table 10: Paired Samples Statistics for the Cooperation-Competition Group

Paired Samples Statistics				
	Mean	N	Std. Deviation	Std. Error Mean
Gamified Cooperation-Competition Strategy post-test	44,4667	15	5,57887	1,44046
Gamified Cooperation-Competition Strategy pre-test	14,4000	15	4,80773	1,24135

Table 10: Paired Samples Test for the Cooperation-Competition Group

Paired Samples Test **(**Gamified Cooperation-Competition Post-test - Gamified Cooperation-Competition Pre-test)							
Paired Differences					t	df	Sig. (2-tailed)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
30,06667	2,65832	0,68638	28,59454	31,53880	43,805	14	0,000

B-1: Descriptive Statistics

Table 20: Comparing Descriptive Statistics for Pre-Test and Post-Test Scores of the Three Groups

Strategies	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Gamified Cooperation Strategy	15	2500	4800	3473.33	669.19
Gamified Competition Strategy	15	2700	4900	3533.33	611.23
Gamified Cooperation-Competition Strategy	15	2900	5100	3673.33	598.26

B-2: Test of Homogeneity of Variances:

Table 21: Levene's for the Three Groups

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Improvement scores	Based on Mean	1,092	2	42	0,345
	Based on Median	0,764	2	42	0,472
	Based on Median and with adjusted df	0,764	2	41,599	0,472
	Based on trimmed mean	0,900	2	42	0,414

B-3: Conducting ANOVA test:

Table 22: ANOVA Test for the Three Groups

ANOVA					
Improvement scores					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	879,244	2	439,622	51,885	0,000
Within Groups	355,867	42	8,473		
Total	1235,111	44			

B-4: Post-hoc Analysis:

Table 23: Post-hoc Analysis for the Three Groups

Multiple Comparisons						
Dependent Variable: Improvement Scores						
Tukey HSD						
(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Gamified Cooperative Strategy	Gamified Competitive Strategy	-4,73333*	1,06289	0,00	-7,3156	-2,1510
	Gamified Cooperative-Competitive Strategy	-10,80000*	1,06289	0,00	-13,3823	-8,2177
Gamified Competitive Strategy	Gamified Cooperative Strategy	4,73333*	1,06289	0,00	2,1510	7,3156
	Gamified Cooperative-Competitive Strategy	-6,06667*	1,06289	0,00	-8,6490	-3,4844
Gamified Cooperative-Competitive Strategy	Gamified Cooperative Strategy	10,80000*	1,06289	0,00	8,2177	13,3823
	Gamified Competitive Strategy	6,06667*	1,06289	0,00	3,4844	8,6490
*. The mean difference is significant at the 0.05 level.						

Discussion

To achieve the main goal of this research, its main question - What is the effectiveness of gamified blended environment strategies in developing the EFL business writing skills for technical and vocational learners? - was broken down into 6 subsequent questions and 4 hypotheses, then these subsequent questions were addressed using the research procedures and the statistical analysis of its data as shown below:

Questions 1 and 2:

To address questions 1—"What are the EFL business writing skills needed for learners of an entry level in business communication?"— and question 2 —"What is the design of the suggested gamified blended environment using the three learning strategies: Gamified Cooperation, Gamified Competition, and Gamified Cooperation-Competition?", the researcher developed and validated a list of English business writing and gamified blended learning environment that included a learning program and an online learning platform.

Question 3:

To address the third research question, the researcher validated the first research hypothesis —"There will be statistically significant differences at the 0.05 level between the mean scores of the achievement test for EFL business writing skills in pre- and post-tests for the gamified cooperation strategy, in favor of the post-test."— through statistical analysis. The analysis revealed a statistically significant improvement in learners' writing skills after employing this strategy. The results provide compelling evidence for the effectiveness of the gamified cooperation strategy. Descriptive statistics showed a clear increase in the mean score from pre-test to post-test, suggesting a positive impact on writing skills. Importantly, normality tests confirmed that the data met the assumptions for the paired-samples t-test, ensuring the reliability of the statistical analysis. The highly significant p-value ($p < 0.001$) from the t-test further strengthens the evidence. It indicates that the observed improvement is unlikely due to chance. Additionally, a large t-value and a substantial effect size provide further support for a strong positive impact of the gamified cooperation strategy.

This aligns with growing evidence supporting gamified learning for language acquisition (Sadeghi et al., 2022; Lui, 2013). The positive impact of the gamified cooperation strategy used in this study strengthens the well-established value of collaborative learning environments (Nguyen et al., 2022; Knutas et al., 2014; Thomas & Berkling, 2013; Riar, 2020; Wolf et al., 2021). Collaborative learning fosters interaction, knowledge sharing, and deeper learning (Nguyen et al., 2022). Gamification adds an engaging layer

to this collaboration, potentially increasing motivation and participation (Knutas et al., 2014, 2019; Thomas & Berkling, 2013; Riar, 2020). Wolf et al. (2021) even suggest cooperation as a superior approach for enhancing engagement.

Interestingly, Morschheuser et al. (2019) found cooperation to be more beneficial than competition in user engagement for crowdsourcing systems. This highlights the importance of considering collaborative elements within gamified learning designs. While research on gamified cooperation specifically for EFL business writing is limited, studies on gamification in broader language learning contexts offer support. For instance, Sadeghi et al. (2022) found positive results in vocabulary acquisition and reading comprehension using gamified collaboration. This suggests potential for similar benefits in EFL business writing.

Question 4:

To address the fourth research question, the researcher validated the second research hypothesis—"There will be statistically significant differences at the 0.05 level between the mean scores of the achievement test for EFL business writing skills in pre- and post-tests for the gamified competition strategy, in favor of the post-test."— through statistical analysis. The data overwhelmingly supports the hypothesis that the gamified competition strategy significantly improves EFL business writing skills. This is evidenced by a substantial increase in average scores from pre-test (1640.00) to post-test (3533.33). Statistical tests confirm this improvement is highly significant ($p < .001$), meaning it's very unlikely due to chance. Furthermore, both the large t-value (35.132) and significant effect size (Cohen's $d = -5.02$) provide strong evidence of a profound positive impact on writing skills achieved through the gamified competition approach. The normality tests also confirm that the data is suitable for the statistical analysis used. The results support Hypothesis 2 validating the effectiveness of the gamified competition strategy in improving learners' skills.

Research supports gamification's positive effects on learning. Studies by Plass et al. (2013), Sailer & Homner (2020), and Ho et al. (2022) demonstrate its ability to improve cognitive, motivational, and behavioral learning outcomes. Notably, competition is shown to enhance in-game learning and overall performance compared to non-competitive settings (Plass et al., 2013; Ho et al., 2022).

However, a more nuanced view emerges upon closer examination. While competition can be motivating, its effectiveness might have limitations. Plass et al. (2013) highlight that the benefits of competition may not translate fully to out-of-game performance, raising concerns about long-term retention of EFL writing skills learned through gamified competition.

Additionally, Morschheuser et al. (2019) emphasize the importance of considering learner preferences, as competition might not universally motivate all students.

Question 5:

To address the fifth research question, the researcher validated the third research hypothesis—"There will be statistically significant differences at the 0.05 level between the mean scores of the achievement test for EFL business writing skills in pre- and post-tests for the gamified competition strategy, in favor of the post-test."— through statistical analysis. The analysis overwhelmingly supports the effectiveness of the gamified cooperation-competition strategy in boosting EFL business writing skills. Average scores nearly tripled from pre-test to post-test, and statistical tests confirm this improvement is highly significant ($p < .001$). This means it's very unlikely due to chance. Furthermore, a large t-value (43.805) and significant effect size (Cohen's $d = -5.62$) provide further evidence of a profound positive impact on writing skills.

This result aligns with existing literature on the effectiveness of gamified cooperation-competition strategies. Studies by Sailer & Homner (2020), Ho et al. (2022), and Morschheuser et al. (2019) found positive impacts on learning outcomes using this approach. They suggest that gamification with elements of both competition and collaboration can be particularly effective in promoting user engagement and learning behaviors like consistent writing practice.

However, there are some key differences from the findings of Ho et al. (2022). While their study also showed gamification to be effective across various settings, they did not find significant benefits from peer collaboration within gamified learning. This contrasts with the current research, where combining cooperation and competition proved to be impactful.

Question 6:

To address the sixth research question, the researcher validated the fourth research hypothesis—"There will be statistically significant differences at the 0.05 level between the mean scores of the achievement test for EFL business writing skills in pre- and post-tests for the gamified competition strategy, in favor of the post-test."— through statistical analysis. The results overwhelmingly support the gamified cooperation-competition strategy as the most effective approach for improving EFL business writing skills. Average scores on the post-test were highest for this group (3673.33), followed by competition (3533.33) and cooperation (3473.33). Statistical tests confirm these differences are highly significant ($p < .001$), meaning they're very unlikely due to chance. A large effect size ($\eta 2 = 0.712$) further

emphasizes the substantial impact of the strategies on writing skills, with over 71% of the improvement explained by the different teaching methods. This combination of descriptive statistics, a significant ANOVA test, large effect size, and post-hoc analysis with Tukey's HSD test provides compelling evidence. The results definitively demonstrate that the gamified cooperation-competition strategy led to the most significant improvement in EFL business writing skills compared to the other strategies tested.

The findings support the effectiveness of the gamified cooperation-competition approach, aligning with Morschheuser et al. (2019) who found inter-team competition (similar to cooperation-competition) led to greater user engagement in a gamified system. However, Ho et al. (2022) did not find a significant difference between combined competition and collaboration compared to purely competitive approaches. This suggests the effectiveness of gamification strategies might vary depending on the educational context, requiring further research to determine optimal design for EFL business writing skills.

Conclusions

This research investigated the effectiveness of three gamified blended learning strategies in fostering EFL business writing skills among technical and vocational education and training trainees. The findings provide compelling evidence that all three strategies – gamified cooperation, gamified competition, and gamified cooperation-competition – significantly improve learners' writing skills. However, the most effective approach appears to be the gamified cooperation-competition strategy.

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