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The Effect of Digital Storytelling on High School Students' English Writing Skills and Foreign Language Anxiety Levels

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Learning a foreign language can be challenging for some students. These problems may arise from various obstacles in the language learning process, like anxiety, difficulty with writing skills, lack of vocabulary, grammatical difficulties, differences in communication styles, lack of motivation, and alike. Considering the technological advances in our time, utilizing information and communication technologies in foreign language teaching can help overcome the difficulties associated with foreign language learning. In this context, digital storytelling is considered important in terms of motivating students and arousing students' interest by providing opportunities for autonomous work, and using multimedia tools during teaching-learning process of foreign language course. Digital storytelling, which allows students to tell their own stories or topics of their own choosing, is a method that supports learning English with a focus on providing learner autonomy. In this context, this research aims to investigate the effect of digital storytelling method on the writing skills and foreign language anxiety levels of high school students. The research was conducted using an experimental design with 10th-grade students from a high school in Türkiye's capital city. The 9th-grade writing skills evaluation rubric, 10th-grade writing skills evaluation rubric, foreign language anxiety scale, and interview form were used as data collection tool. The quantitative data were analyzed using SPSS 22, and the qualitative data was analyzed by deductive analysis approach. The results of the study showed that digital storytelling significantly improved students' English writing skills but did not create a significant difference in their foreign language anxiety levels. The qualitative data showed that the students in the experimental group reported a decrease in their foreign language anxiety, an increase in their interest in the lesson, more enjoyable lessons, and an increase in their motivation to participate in the lesson after the digital storytelling.

Introduction

In foreign language education, students' deficiencies in vocabulary, grammar, spelling, and punctuation pose significant challenges in developing writing skills (Yusuf et al., 2019).

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Additionally, students' attitudes and anxieties significantly impact their skill development (Carson, 2001). Teachers must therefore select tools and methods that address these needs (Negari, 2011). In the current era, digital technologies enhance student interaction, creativity, and knowledge transfer, making them valuable in teaching writing (Raja & Nagasubramani, 2018). Technology in foreign language education captures students' attention, encourages active participation, and improves focus (Sullivan & Pratt, 1996). Proper use of technology also helps students access information quickly, stay motivated, and develop critical thinking skills (Sadik, 2008). Moreover, technology provides personalized learning opportunities and enables interaction with the language outside the classroom (Al-Mahrooqi & Troudi, 2014). At this point, digital storytelling is one such effective method (Reyes Torres et al., 2012).

Digital storytelling combines traditional storytelling with modern technology, allowing students to create and present stories using multimedia tools (Miller, 2019; Robin, 2008). It supports language learning by incorporating vocabulary, grammar, and sentence structures (Amelia & Abidin, 2018). Students also learn cultural expressions and improve their listening, speaking, reading, and writing skills through visuals and auditory messages (Green, 2013; Başkan & Ustabulut, 2020). Digital storytelling fosters self-awareness and helps students organize their thoughts coherently (Christensen, 2012; Oskoz & Elola, 2014). Furthermore, it enhances emotional development and intrinsic motivation, which are crucial for learning (Gömleksız & Kan, 2012; Guthrie & Cox, 2001). By increasing interaction and reducing anxiety, digital storytelling creates a supportive learning environment (Green, 2013). According to the constructivist approach, the learning process is effective as long as students socialize and share what they produce with their environment, and digital storytelling creates this atmosphere that students need (Banzato, 2014).

Teachers play a vital role in guiding students through the digital storytelling process. They help students set objectives, share ideas, and create meaningful stories (Robin, 2006; Miller, 2009). Teachers must align digital storytelling with the curriculum and address students' needs (Lowenthal, 2009). Students, on the other hand, focus on crafting their stories and digitizing them, which helps them develop critical media literacy (Ohler, 2006; Porter, 2008). Effective storytelling requires students to internalize and communicate their messages clearly (Behmer et al., 2006).

Research on the use of digital storytelling in foreign language teaching indicates that it improves students' speaking (e.g., Lustenberger, 2024; Mutua et al., 2024 Abdolmanafi-Rokni & Qarajeh, 2014; Anderson et al., 2018; Esen, 2019; Normann, 2011), listening (e.g., Fakhrudin et al., 2024; Akdamar, 2021; Yang & Wu, 2012), reading (e.g., Gümüş, 2023; Adıgüzel & Kumkale, 2018; Nassim, 2018; Nnakwe, 2019; Yang & Wu, 2012; Yoon, 2012), writing (e.g., Ngoi et al., 2024; Puspitarini & Junaedi, 2024; Zarei & Navidinia, 2024; Balaman-Uçar, 2016; Nassim, 2018; Stojke, 2009; Yang & Wu, 2012), critical thinking (e.g., Yang & Wu, 2012), and creative thinking skills (Yang et al., 2022). It has also been shown to increase motivation (e.g., Tamimi, 2024; Aljaraideh, 2020; Bekar, 2019; Campbell, 2012; Leong et al., 2019; Kaya & Tolu, 2017; Normann, 2011; Razmi et al., 2014; Yang & Wu, 2012; Yoon, 2012), interest (e.g., Stojke, 2009; Leong et al., 2019; Yoon, 2012), and self-confidence (e.g., Anderson et al., 2018; Hava, 2021; Yoon, 2012), while reducing listening (Rahimi & Soleimany, 2015) and speaking anxiety (e.g., Nadianti et al., 2024; Mohammadi Khomjani, 2020).

A review of the literature reveals a limited number of studies on the impact of digital storytelling on the writing skills of high school students in a foreign language. Older students, with higher digital literacy, can effectively use digital storytelling to share experiences, present

research, and convey knowledge (Robin, 2016; Wang & Zhan, 2010). In Türkiye, integrating technology into high school English programs has been encouraged to boost students' confidence and motivation (MoNE, 2018). Digital storytelling provides a secure environment that reduces anxiety and enhances language learning (Hashwani, 2008). Within this scope, this study examines the effect of the digital storytelling method on high school students' English writing skills and foreign language anxiety levels. The research questions are:

(1) Is there a significant difference between the English writing levels of 10th-grade students in the experimental and the control groups?
(2) Is there a significant difference in foreign language anxiety levels between the two groups?
(3) How are the experimental group students' opinions about English language teaching enriched with digital storytelling?

Method

This study employed a quasi-experimental pre-test and post-test control group design to examine the impact of digital storytelling on high school students' English writing skills and foreign language anxiety. Quasi-experimental designs, used when true experimental controls are unattainable (Karasar, 2005), maintain experimental validity but can only infer potential causality due to their less controlled environments (Gefen & Ridings, 2002). In this study, designed as an experimental model, two groups were involved: the experimental group and the control group. The experimental group (one class, 40 students) participated in writing lessons enriched with the digital storytelling method for two instructional hours (80 minutes) per week over eight weeks (640 minutes in total). During this process, the experimental group first wrote stories based on the assigned theme under their English teachers' guidance, refining them through peer and teacher feedback. They then visualized and summarized their stories on a storyboard, receiving additional feedback on organization. Next, they digitized their stories, making continuous revisions based on feedback. Finally, the digital stories were shared in class, where teachers and peers provided comments. The control group (one class, 40 students), on the other hand, participated in traditional writing lessons for two instructional hours (80 minutes) per week over eight weeks (640 minutes in total).

Participants

The participants of the study consisted of 10th-grade students from two classes in a public high school in Ankara's (the capital of Türkiye) central district during the 2021–2022 academic year. At the beginning of the study, four different sections were selected (totally 160 students) to write an essay on a topic covered in the 9th grade, and their cognitive entry behaviors were determined using a 9th-grade writing task rubric developed by the researcher. The most important reason for determining cognitive entry behaviors here is that, to start teaching activities and acquire new behaviors, a student must first develop the necessary cognitive entry behaviors such as pre-learning, development, intellectual and learning abilities (Yeşilyurt, 2020). At this point, nineth grade writing skills as previous writing proficiency of student, were checked. Based on the results of the rubric, two classes with similar characteristics were selected (Karasar, 2005), and the other two classes were excluded from the study. Random assignment was then used to designate one class as the experimental group and the other as the control group (Aydede & Matyar, 2009; Karasar, 2005). The difference in cognitive entry behavior test scores between these groups was analyzed using an independent samples t-test, a statistical method for assessing significant differences between two independent group means,

especially in small-scale experiments (Field, 2013), and provides higher discrimination compared to other nonparametric tests (Sheskin, 2004). The results are presented in Table 1.

Table 1 Results of Independent Samples t-Test on Cognitive Entry Behavior Test Scores of Experimental and Control Groups

Group	n	$\underline{X}$	ss	t	p
Experimental	40	13.00	4.73	-.057	.954
Control	40	13.05	4.36		

*$p < .05$

As shown in Table 1, the difference between the equivalence scores of the control and experimental groups was not statistically significant ($p > 0.05$). In other words, as observed from the mean scores, the groups were found to be equivalent due to their similar results. The difference in pre-test writing scores between the experimental and control group students was also analyzed using an independent samples t-test. The arithmetic means, standard deviations, and t-values of the students' pre-test writing scores are presented in Table 2.

Table 2 Results of Independent Samples t-Test on Pre-Test Writing Scores of Experimental and Control Groups

Group	**n**	$\underline{X}$	**ss**	**t**	**p**
Experimental	120	5,74	3,22	.597	.551
Control	120	5,49	3,26		

*p < .05

As seen in Table 2, the pre-test writing scores of the experimental and control groups were analyzed using an independent samples t-test. It was observed that there was no difference in terms of pre-test scores because the scores of the experimental and control groups were equal. The difference in foreign language anxiety scale pre-test scores between the experimental and control group students was also analyzed using an independent samples t-test. The results are shown in Table 3.

Table 3 Results of Independent Samples t-Test on Pre-Test Foreign Language Anxiety Scores of Experimental and Control Groups

Group	**n**	$\underline{X}$	**ss**	**t**	**p**
Experimental	40	90,65	26,55	1.823	.072
Control	40	80,25	24,41		

*p < .05

As shown in Table 3, an independent samples t-test was used to analyze the pre-test anxiety scores of the experimental and control groups, revealing no statistically significant difference between them ($p > 0.05$). This indicates that both groups had equivalent foreign language anxiety levels before the experimental procedure. Following these analyses, the study included 15 male and 25 female students in the experimental group and 18 male and 22 female students in the control group, totally 80 students (40 per group). To control for instructor-related variability, the same English teacher taught both groups throughout the study.

Additionally, one-on-one interviews were conducted with 15 students from the experimental group to explore their perspectives on digital storytelling-based instruction and its impact on their writing skills and foreign language anxiety. Maximum variation sampling was employed to gather diverse viewpoints on the experimental process. To ensure diversity, students were categorized into high (n=6), medium (n=5), and low (n=4) achievement levels based on their English course grades, and volunteers from each group were interviewed.

Procedure

Before the experiment, the "Writing Skills Task" and the "Foreign Language Anxiety Scale," were administered as pre-tests. During the process, the digital storytelling was implemented in the following stages and a digital storytelling check list related with these stages is also given to students to follow up digital storytelling steps by themselves:

(1) Informing students: The experimental group was introduced to digital storytelling and its steps.
(2) Choosing a Topic – Students selected story topics within the lesson's theme.
(3) First Draft – Students wrote and submitted drafts for teacher feedback.
(4) Revision – Based on feedback, they refined their stories for coherence and accuracy.
(5) Creating Storyboards – Students illustrated key scenes, summarizing them with text, and received feedback.
(6) Digitalization – They sourced visuals, selected music, and learned about copyright compliance.
(7) Video Editing – Using editing software, students combined visuals, text, narration, and background music.
(8) Presentation – Final videos were presented in class, with feedback from peers and the teacher.

After the experimental process, the "Writing Skills Task" and the "Foreign Language Anxiety Scale" were administered again as post-tests. In addition, one-on-one interviews were conducted with 15 students from the experimental group to examine in depth thoughts of them about experimental process after post-test is applied.

Instruments

9th and 10th Grade Writing Tasks and Analytical Rubrics

For the pilot testing process, students wrote a 150-200 word essay on a topic covered in their grade level. Their essays were evaluated using researcher-developed analytical rubrics for each grade level, scored from 0 (inadequate) to 4 (excellent), covering content, organization, grammar, vocabulary, spelling, and punctuation. Rubric for 9th grade was used to measure students' writing ability in accordance with the given topic by checking whether they organize their ideas correctly, and use simple grammatical structures, daily routines, and punctuation marks correctly and effectively or not while 10th grade rubric was used to measure students' writing ability in accordance with the given topic by checking whether they use supporting sentences, use conjunctions to organize ideas, use different grammatical structures, various words and terms appropriate to the topic, and use punctuation marks correctly and effectively or not.

Before the implementation, four curriculum development experts and two English language

education experts reviewed the rubrics for content validity, leading to necessary revisions. After rubrics were applied, the reliability of the 9th-grade rubric was calculated and found to have a Cronbach alpha value of 0.88, and the 10th-grade rubric a value of 0.85. Additionally, the reliability of both rubrics was assessed using Generalizability Theory, which accounts for all sources of error (Güler, 2011). The G coefficient for the 9th-grade rubric was 0.72 (based on 35 individuals, five tasks, and three raters), while for the 10th-grade rubric, it was 0.74 (based on 34 individuals, five items, and three raters). The G Coefficient is interpreted as the reliability coefficient in Classical Test Theory, and reliability increases as the value approaches 1 (Güler, 2011). In this case, it is possible to say that rubrics are reliable.

Foreign Language Anxiety Scale

The Foreign Language Anxiety Scale was used as a pre-test and post-test to examine the effects of digital storytelling on students' foreign language anxiety levels. In Horwitz's (1986) study with 300 foreign language learners, the internal consistency of the scale was found to be 0.93. Aydın (1999), who adapted the scale into Turkish, found an internal consistency of 0.91 with 72 foreign language learners. The scale comprises 32 items on a five-point Likert scale, supplemented by a personal information form developed by the researcher. Reliability analysis conducted for this study showed a Cronbach's alpha of 0.95, indicating strong internal consistency.

Student Interview Form

Qualitative data were gathered using a semi-structured interview form developed by the researcher. To ensure content validity, the form was reviewed by four program development experts and two English language teaching experts. Based on their feedback, necessary revisions were made, resulting in a final version with eight questions. With students' consent, interviews were audio-recorded and later transcribed by the researcher for analysis.

Data Analysis

Quantitative data were analyzed using SPSS 22 software, while qualitative data were analyzed using deductive analysis approach. To ensure equivalence between the groups before the experimental application, the 9th-grade writing task and rubric was applied, and the results were analyzed using an independent samples t-test. In the study, it was investigated whether there was a significant difference in writing levels between the experimental group and the control group of the 10th grade students with the 10th-grade writing task and rubric. Cognitive entry behaviors of the experimental and control groups were equivalent, and no significant difference was observed between their pre-test writing scores. Despite this, Analysis of Covariance (ANCOVA) was utilized to determine whether there was a significant difference between the groups' pre-test and post-test writing scores. ANCOVA combines elements of analysis of variance (ANOVA) and regression to statistically control for the effects of confounding variables, known as covariates. By adjusting for these covariates, ANCOVA ensures a cleaner comparison of group means and isolates the effect of the independent variable on the dependent variable. This method was chosen because it not only accounts for the influence of covariates but also reduces error variance, thus increasing the statistical power of the analysis. Importantly, ANCOVA remains effective even when there is no significant difference in the covariate itself, making it a robust tool for controlling variables that may impact the dependent variable (Büyüköztürk, 1998; Field, 2013; Tabachnick & Fidell, 2019; Taşpınar, 2017). Within the scope of the second sub-problem of the research, it was tested whether there was a significant difference in terms of foreign language anxiety levels between

the experimental group and the control group. In the study, it was also examined by analysis of covariance (ANCOVA) whether there was a significant difference in terms of foreign language anxiety levels between the experimental group and the control group of the 10th-grade students. The opinions of the students in the experimental group regarding English language teaching enriched with the digital storytelling method were examined, and that qualitative data were analyzed using the deductive analysis approach. Student names were coded with the letter "S".

Validity and Reliability of Qualitative Data

First, the researcher conducted a word-by-word analysis of the transcriptions to identify codes. To ensure reliability, two independent coders (English Language Education Experts) reviewed six pages of interview transcripts, matching the identified codes with the data. The inter-coder agreement was calculated at 88%, exceeding the 70% threshold considered sufficient by Miles and Huberman (2015). The experts then discussed discrepancies and reached a consensus on the critical codes.

Findings

The primary aim of this study is to examine the effects of English instruction enriched with the digital storytelling method on high school students' English writing skills and foreign language anxiety levels. This section presents the findings related to the sub-research questions in sequence.

Findings on Writing Levels of 10th Grade Students in the experimental group and the control group

First, a paired samples t-test was conducted to determine whether there was a significant difference between the pre-test and post-test writing scores of the experimental and control groups. The results for the experimental group's pre-test and post-test writing scores are shown in Table 4.

Table 4 Paired Samples t-Test Results for Writing Scores of the Experimental Group

Tests	n	$\underline{X}$/20	ss	T	p
Pre-Test	40	5,74	2,86	-19,476	.000
Post-Test	40	11,63	3,40		

*$p < .05$

As seen in Table 4, the difference between the writing pre-test and post-test of the experimental group students was examined with the dependent sample t-test and the difference between the groups was found to be statistically significant (t(39)=-19.476; p<0.01). When the effect of this difference was examined, it was observed that there was an almost two-fold increase in the writing scores of the experimental group students after the post-test. The paired samples t-test results for the control group's pre-test and post-test writing scores are presented in Table 5.

Table 5 *Paired Samples t-Test Results for Writing Scores of the Control Group*

Tests	n	$\underline{X}$/20	ss	t	p
Pre-Test	40	5,49	2,92	-3,739	.111
Post-Test	40	6,50	2,57		

*$p < .05$

As shown in Table 5, there was no statistically significant difference between the pre-test and

post-test writing scores of the control group (p > 0.05). Before the experimental intervention, an independent samples t-test was conducted to determine whether there was a significant difference between the cognitive entry behaviors and pre-test writing scores of the experimental and control groups, and no significant difference was found between the groups' pre-test writing scores (see Table 2). Although there was no difference between the writing pre-test scores of the groups, the data obtained were examined with analysis of covariance (ANCOVA) due to the high statistical power it provided. First, the assumptions for conducting ANCOVA were tested. Descriptive statistics regarding the normality of the data are presented in Table 6.

Table 6 Descriptive Statistics for Pre-Test and Post-Test Writing Scores of the Experimental and Control Groups

Groups	Tests	n	$\underline{X}$	ss	Skewness	Kurtosis
Experimental	Pre-test	40	5,74	2,86	,825	,106
	Post-test	40	11,63	3,40	,527	-,508
Control	Pre-test	40	5,49	2,92	1,306	3,726
	Post-test	40	6,50	2,57	1,200	1,266

The values in Table 6 indicate that the distributions of the scores do not deviate significantly from normality. A Levene's test was conducted to determine the homogeneity of variances. The results of Levene's test indicated that the assumption of homogeneity of variances was met (p > 0.05). The results of the ANOVA applied to test the equality of the regression line ratios regarding the prediction of the post-test scores of the groups based on their writing pre-test scores are given in Table 7.

Table 7 Analysis Results Related to Equality of Slopes of Regression Lines

Source of variance	**KT**	**sd**	**KO**	**F**	**p**	**Partial Eta Squared**
Corrected model	1004.934a	3	334.978	110.882	.000	.814
Intersection	300.406	1	300.406	99.438	.000	.567
Group x Pre- Test	11.255	1	11.255	3.725	.057	.047
Group	48.592	1	48.592	16.085	.000	.175
Pre-Test	469.238	1	469.238	155.323	.000	.671
Error	229.599	76	3.021			
Total	7810.889	80				
Corrected Total	1234.533	79				

a. R-squared = ,814 (Corrected R-squared = ,807)

When Table 7 is examined, it is seen that the joint effect of "Group*Pretest" on the students' post-test scores is not significant [F(1,76)=3.725; p>0.05]. This finding shows that the slopes of the regression lines calculated for predicting the post-test scores of the groups based on their pre-test scores are equal. In this case, as a result of the analysis, it was decided that it was appropriate to examine the data with covariance analysis (ANCOVA). The arithmetic means, adjusted arithmetic means, and standard deviations of the pre-test and post-test writing scores are presented in Table 8. Covariance analysis for the experimental and control group writing scores is presented in Table 9.

Table 8 Descriptive Statistics on Writing Pre-Test and Post-Test Scores of Experimental and Control Groups

Groups	**Tests**	**n**	**x̄/20**	**ss**	**Adjusted Mean**
Experimental	Pre-Test	40	5.74	3.22	
	Post-Test	40	11.63	3.67	11.61
Control	Pre-Test	40	5.49	2.92	

	Post-Test	40	6.50	2.57	6.48

Table 9 Results of Analysis of Covariance (ANCOVA) on Writing Scores of Experimental and Control Groups

Source of variance	KT	sd	KO	F	p
Model	993.679	2	496.840	158.838	.000
Pre-Test	466.657	1	466.657	149.188	.000
Group	483.535	1	483.535	154.584	.000
Error	240.854	77	3.128		
Total	7810.889	80			

*$p < .05$

When Tables 8 and 9 are examined together, it is seen that there is a statistically significant difference between the adjusted post-test 'Writing' scores according to the pre-test scores of the experimental and control group students, in favour of the experimental group (F(154.584)= 0.000 p<0.05). When all the findings obtained within the scope of this sub-problem were evaluated together, it was concluded that the teaching enriched with the digital storytelling method applied to the experimental group significantly increased the students' writing scores.

Findings on foreign language anxiety levels of 10th grade students in the experimental group and the control group

The study investigated whether there was a significant difference between the pre-test and post-test scores of the Foreign Language Anxiety Scale within the experimental and control groups using a paired samples t-test. The results of the t-test for dependent samples regarding the pre-test and post-test scores of the Foreign Language Anxiety Scale of the students in the experimental group are presented in Table 10.

Table 10 T-Test Results on Foreign Language Anxiety Scale Pre-Test and Post-Test Scores of the Experimental Group

Tests	n	$\underline{X}$/160	Ss	t	p
Pre-Test	40	90,65	26,55	1.766	.085
Post-Test	40	85,60	26,47		

*p < .05

As seen in Table 10, the pre-test and post-test scores of the foreign language anxiety scale of the experimental group were examined using the dependent sample t-test, and it was found that the difference between the groups was not statistically significant (p>0.05). Although a reduction in anxiety scores was observed in the post-test, the difference was not statistically significant. The dependent sample t-test results of the Foreign Language Anxiety Scale pre-test and post-test scores of the students in the control group are presented in Table 11.

Table 11 T-Test Results on Pre-Test and Post-Test Scores of the Foreign Language Anxiety Scale of the Control Group

Tests	n	$\underline{X}$/160	Ss	t	p
Pre-Test	40	80,25	24,41	-.084	.934
Post-Test	40	80,55	27,08		

*p < .05

As seen in Table 11, the difference between the pre-test and post-test scores of the foreign language anxiety scale of the control group was not statistically significant (p>0.05). Before

the experimental procedure, an independent sample t-test was used to examine whether there was a significant difference between the foreign language anxiety scale pre-test scores of the experimental and control groups (see Table 3), and no significant difference was found between the foreign language anxiety pre-test scores. Although there was no difference between the foreign language anxiety pre-test scores of the groups, the data obtained were examined with analysis of covariance (ANCOVA) due to the high statistical power it provided. First, it was tested whether the data met the assumptions for covariance analysis. Descriptive statistics regarding the normality of the data are given in Table 12.

Table 12 Descriptive Statistics Regarding Foreign Language Anxiety Scale Pre-Test and Post-Test Scores of Experimental and Control Groups

Groups	Testler	n	$\underline{X}$	ss	Skewness	Kurtosis
Experimental	Pre-test	40	90,650	26,55864	-,015	-,752
	Post-test	40	85,600	26,47476	,214	-1,003
Control	Pre-test	40	80,250	24,4139	,761	,065
	Post-test	40	80,550	27,08955	,731	-,088

When all values in Table 12 are examined, it is observed that the distribution of the scores for the variables is normal. Levene test was performed to determine whether the group variances were homogeneous. According to the Levene test result, since p=0.319>0.05, it can be said that the assumption of homogeneity of variances was met. Finally, the ANOVA results applied to test the equality of the slopes of the regression lines regarding the prediction of the post-test scores of the groups based on the foreign language anxiety scale pre-test scores are given in Table 13.

Table 13 Analysis Results Related to Equality of Slopes of Regression Lines

Source of variance	KT	sd	KO	F	p	Partial Eta Squared
Corrected model	27498.669	3	9166.223	24.049	.000	0.487
Intersection	2802.224	1	2802.224	7.352	.008	0.088
Group x Pre- Test	81.410	1	81.410	.214	.645	0.003
Group	139.886	1	139.886	.367	.546	0.005
Pre-Test	26470.127	1	26470.127	69.449	.000	0.477
Error	28966.881	76	381.143			
Total	608582.000	80				
Corrected Total	56465.550	79				

a. R-squared = ,487 Corrected R-squared = ,467)

When Table 13 is examined, it is seen that the joint effect of "Group*Pre-test" on the students' post-test scores is not significant [F(1,76)=0.214; p>0.05]. This finding shows the equality of the slopes of the calculated regression lines regarding the prediction of post-test scores based on the pre-test scores. In this case, no significant difference was found between the post-test scores adjusted according to the pre-test scores. In other words, it was seen that the independent variable did not create a statistically significant difference on the dependent variable. As a result of the analyses, it was decided to examine the data with covariance analysis (ANCOVA).

The arithmetic means, adjusted arithmetic means and standard deviations of the foreign language anxiety scale pre-test and post-test scores of the students in the experimental and control groups are presented in Table 14. The results of covariance analysis regarding foreign language anxiety scores of the experimental and control groups are presented in Table 15.

Table 14 Descriptive Statistics on Foreign Language Anxiety Pre- and Post-Test Scores of Experimental and Control Groups

Groups	Tests	n	x̄/160	ss	Adjusted Mean
Experimental	Pre-Test	40	90.65	26.56	
	Post-Test	40	85.60	26.47	81.62
Control	Pre-Test	40	80.25	24.41	
	Post-Test	40	80.55	27.09	84.11

Table 15 *Results of Analysis of Covariance (ANCOVA) on Anxiety Scores of Experimental and Control Groups*

Source of Variance	KT	sd	KO	F	p
Model	27417.259a	2	13708.630	36.338	.000
Pre-Test	26907.209	1	26907.209	71.325	.000
Group	122.042	1	122.042	.324	.571
Error	29048.291	77	377.251		
Total	608582.000	80			

*p < .05

When Tables 14 and 15 are examined together, it is seen that there is no statistically significant difference (F(0.324)= 0.571 p>0.05) between the adjusted post-test 'Foreign Language Anxiety Scale' scores according to the pre-test scores of the experimental and control group students. When all the findings obtained within the scope of this sub-problem are evaluated together, it is concluded that the experimental procedure did not significantly change the students' foreign language anxiety scores. Accordingly, it is possible to say that the independent variable did not make a difference on the dependent variable.

Findings Related to the Experimental Group Students' Opinions on English Instruction Enriched with Digital Storytelling

This study aimed to explore students' perceptions of English language teaching enriched with digital storytelling. When asked about its effects on their learning, 14 out of 15 interviewed students reported improvements in writing skills, vocabulary, grammar, overall proficiency, listening, and speaking. They also noted enhanced retention and increased engagement in lessons.

Students frequently mentioned improvements in their writing skills (f=14) in their responses to the question about the effect of digital storytelling on English learning. Since digital storytelling primarily begins with creating a text, students felt that their vocabulary (f=5) and grammar knowledge (f=5) had improved. Many students (f=8) reported that their overall English knowledge increased due to being constantly exposed to English during the process, with two students emphasizing that their learning became more permanent through digital storytelling (f=2). One student noted that their speaking and listening skills improved as they narrated their stories and continuously heard themselves during the process (f=1). Students who were asked for their opinions within the scope of the sub-theme of the effect of digital storytelling on learning English stated in their responses that digital storytelling increased their interest in the course in the affective domain dimension (f=5). Some students (f=5) mentioned that the sense of achievement and the products they created boosted their confidence. Additionally, students (f=3) said they enjoyed the process and felt more motivated to participate in the lessons. As a result of this increased motivation, some students (f=4) noted a decrease in their foreign language anxiety, which made them feel more comfortable communicating in English. Students emphasized that creating a storyboard and revising their work based on feedback strengthened

their writing skills and retention. The findings indicate that students across different achievement levels engaged with digital storytelling in unique ways, yet all experienced its benefits. Students' answers to the question about the effect of digital storytelling on learning English are given below.

> "It helped my English learning a lot. I started writing when I couldn't write before, and I also learned different vocabulary and when to use which grammar structures. So, I saw a lot of benefits." (S2)
>
> "Of course, because I made 5-6 drafts before finalizing. Therefore, overall, my writing improved a lot." (S5)
>
> "I think it positively affected me. Especially in writing, my skills improved significantly. When I added visuals to represent my story, it became clearer in my mind." (S10)
>
> "At first, I was afraid I wouldn't be able to do it, but as the process continued and I saw that I could, I became more eager. I became happy. As I said, I started forming better sentences, and since we continuously wrote texts, my English developed even more. I started forming sentences more quickly in my mind." (S8)

Students were also asked about the impact of digital storytelling on their writing and foreign language anxiety. All students reported a reduction in writing anxiety. Regarding foreign language anxiety, most students (f=10) experienced a decrease, while a smaller group (f=5) stated that their anxiety remained unchanged. Examples of student responses regarding the effect of digital storytelling on foreign language anxiety are as follows:

> "When a question came unexpectedly, I used to panic about how to form sentences, but I overcame this anxiety. Since I've learned so much, there's nothing to be afraid of now. If our teacher asked a question, I could answer immediately." (S2)
>
> "I used to worry about others mocking me, but since I gained more knowledge through digital storytelling, I wasn't as anxious, and my anxiety generally decreased." (S4)
>
> "I didn't notice any significant effect, honestly. I continued with English lessons the same way after digital storytelling as I did before." (S12)

The interview forms of five students who reported no reduction in writing anxiety were analyzed, revealing common sources of their apprehension. These students expressed fears of making mistakes, being ridiculed, and feeling embarrassed in front of others. Their anxiety was not linked to digital storytelling itself but rather to pre-existing concerns.

Most students (f=10) acknowledged feeling anxious about writing activities in English class, often avoiding them and relying on translation apps. In contrast, five students (f=5) reported confidence in their writing skills and were unafraid of making mistakes. Below are their responses regarding foreign language writing anxiety:

> "No, because as I said, making mistakes while doing something I enjoy isn't very scary." (S14)
>
> "Yes, I feel it. I feel it a lot. I think I'll make many mistakes, so sometimes I don't even want to write." (S3)

Following digital storytelling, most students (f=10) reported reduced or eliminated anxiety. They emphasized the individualized learning process and the constructive feedback, which improved their writing skills and alleviated anxiety. Examples of student responses about the impact of digital storytelling on writing anxiety are as follows:

> "There was a significant reduction in my anxiety. I regained my confidence. In the past, I used to think my classmates would laugh at me, but now I don't think that way. Everyone makes mistakes; we're all learning English in class, so why shouldn't I make mistakes too?" (S8)

> "Yes, it definitely reduced my anxiety because while writing, I also learned the correct spellings and pronunciations of words." (S1)

Student responses indicate that digital storytelling enhanced their sense of success, leading to increased self-confidence. Overall, interview findings suggest that students found digital storytelling beneficial, with most reporting reduced or eliminated anxiety.

Discussion

The study examined whether there was a significant difference between the pre-test and post-test writing scores of the experimental and control groups. The findings revealed a statistically significant difference between the adjusted post-test writing scores of the experimental and control groups based on their pre-test scores ($F(319.911) = 0.000$, $p < 0.05$). Accordingly, it was concluded that the digital storytelling method is more effective than the traditional method in improving English writing skills. These findings align with previous studies that highlight the positive effects of digital storytelling on students' English writing skills (Balaman-Uçar, 2016; Chiang, 2020; Nassim, 2018; Yang & Wu, 2012) and general writing skills (Azmi Zakaria & Aziz, 2019; Campbell, 2012; Doğan, 2007; Sarıca & Usluel, 2016; Stojke, 2009; Tanrıkulu, 2020; Yamaç & Ulusoy, 2016; Yüksel et al., 2011).

The study revealed a statistically significant difference in writing scores between the experimental and control groups, favoring the digital storytelling method ($F(319.911) = 0.000$, $p < 0.05$). This aligns with previous studies highlighting digital storytelling's positive impact on writing skills (Balaman-Uçar, 2016; Chiang, 2020; Nassim, 2018; Yang & Wu, 2012). Qualitative findings further supported these results, with students reporting improved writing skills due to continuous feedback and revisions during the storytelling process. Similarly, Stojke (2009) found that after implementing digital storytelling, students engaged more meaningfully with the revision step, which is a critical part of the writing process. Additionally, students emphasized improvements in their grammar and vocabulary knowledge. In line with this study, Azmi Zakaria and Aziz (2019) found similar results in their research with high school students, noting advancements in content, language, and vocabulary. Likewise, Nassim (2018) also supported the findings that digital storytelling enhances grammar and vocabulary acquisition. While this study focused on high school students, Yamaç and Ulusoy (2016) conducted their research with 3rd-grade primary school students and similarly found that digital storytelling improved students' writing organization, word choice, word variety, sentence fluency, writing quality, and ideas.

However, no significant difference was found in foreign language anxiety levels between the groups ($F(0.324) = 0.571$, $p > 0.05$). Despite this, qualitative interviews revealed that 10 out of 15 students experienced reduced or eliminated anxiety after participating in digital storytelling. Students attributed this to the secure and motivating environment created by technology integration, which aligns with previous research (Al-Mahrooqi & Troudi, 2014; MoNE, 2018; Hashwani, 2008). Digital storytelling's student-centered approach fosters autonomy and real-life connections, reducing anxiety and boosting confidence (Kearney & Schuck, 2006; Sadik, 2008). Previous studies on digital storytelling (Azmi Zakaria & Aziz, 2019; Campbell, 2012; Doğan, 2007; Yamaç & Ulusoy, 2016; Yang & Wu, 2012; Yüksel et al., 2011) also support the finding that using technology in education enhances motivation. Students also stated that their anxiety decreased as they completed better writing work thanks to the feedback they received.

The discrepancy between quantitative and qualitative findings may stem from students' self-evaluations during interviews, where they provided more sincere and in-depth responses compared to surveys (Altındağ, 2015; Can Aran & Senemoğlu, 2020). Students also reported

increased motivation and engagement, attributing their reduced anxiety to improved writing skills and self-confidence through feedback (Kaya & Tolu, 2017; Matsuda, 2003). According to Krashen, motivation, attitude, anxiety, and self-confidence can be an obstacle for an individual to learn a second foreign language. Encouraging social and oral activities, creating a warm environment, using group discussion can be alternatives to lower students' anxiety (Du, 2009). Constructivist learning theory supports this, emphasizing the importance of social interaction and meaningful activities in reducing anxiety (Good & Brophy, 1994). An educational environment that integrates technology supports student learning (Nikitina, 2009; Wu & Yang, 2009). Digital storytelling fosters socialization as students share their stories and learn through feedback (Banzato, 2014; Nguyen, 2011). Many students reported overcoming fears of public scrutiny, gaining confidence, and experiencing reduced anxiety (f=7), with some eliminating it entirely (f=3). This aligns with findings that digital storytelling enhances self-efficacy, motivation, and writing confidence (Chiang, 2020; Stojke, 2009; Grindle, 2014). Balaman-Uçar (2016) similarly observed decreased writing anxiety post-intervention. These qualitative findings support the conclusion that digital storytelling reduces foreign language anxiety.

Conclusions and Recommendations

The study found that digital storytelling significantly enhanced 10th-grade students' English writing skills and can be integrated at various high school levels. While primarily examining writing, student interviews indicated improvements in vocabulary, grammar, speaking, and listening. Digital storytelling can also be used as a speaking activity, as students vocalize their own stories. Students frequently repeat their stories during the vocalization phase, which supports their pronunciation and fluent speaking. Additionally, by combining auditory and visual elements, it supports listening comprehension. Future research could explore its impact on other language skills.

This study also examined the impact of digital storytelling on students' foreign language anxiety. While quantitative results showed no significant change, interviews revealed a reduction in anxiety. This suggests that integrating digital storytelling into curricula can not only enhance language skills but also address affective barriers by fostering confidence and reducing fear of mistakes. By providing students with opportunities to express themselves through personalized, meaningful stories, teachers can help build students' confidence and diminish the fear of making mistakes. Collaborative elements, such as peer feedback and group discussions, may further alleviate anxiety by normalizing challenges in learning. Future research could explore the long-term effects of digital storytelling on anxiety through extended interventions and longitudinal studies. Investigating which aspects—peer collaboration, teacher feedback, or technology use—contribute most to anxiety reduction could enhance instructional design. The students also stated that their motivation to participate in lessons and their interest in the subject increased. Based on these findings, future research could extend the duration of the experimental process and use alternative measurement tools to explore whether students' anxiety levels decrease over time. Additionally, the effects of digital storytelling on other affective features such as self-efficacy, motivation, attitude or classroom engagement, beyond the scope of this study, could be investigated. This research was conducted in a public school in Ankara. To broaden the scope of the study, similar research could be carried out in different cities and with students from various types of schools. In addition, this research was conducted with students who know English at A2 level in high school. In the future, it can be conducted with students with different language proficiency and different cultural background. Additionally, identifying students with different learning styles and conducting a comparative

study between these groups expands the scope of the research.

For effective classroom implementation, teachers can use digital storytelling to engage students, foster inquiry-based learning, and connect new concepts with prior knowledge (Robin, 2006). This method saves time, enhances participation, and motivates students (Alismail, 2015). Teacher-created digital stories can help clarify abstract concepts and encourage critical thinking (Robin, 2006). Rather than focusing solely on students' final stories, assessing the storytelling process itself provides deeper insights into learning progress (Normann, 2011). The flexibility of digital storytelling allows for adaptation to diverse learning styles, making it an inclusive technique for both high-achieving and struggling students. Since digital storytelling software may differ from standard school technology, teachers should be proficient in its use and provide necessary training to ensure students can focus on language learning without technical barriers.

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