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Effects of Digital Storytelling on Vietnamese EFL Students' Writing Performance in Narrative Paragraphs

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***Abstract*—This study aims to shed light on the effects of digital storytelling (DST) on English as a Foreign Language (EFL) students' writing performance in narrative paragraphs at a university in the Mekong Delta of Vietnam. The study participants were 53 non-English major students, of whom 28 were in the control group and 25 were in the experimental group (EG). While digital storytelling was used to teach students in the experimental group, mind-mapping (MM) was employed for the learners of the control group (CG) throughout an 8-week intervention. Data was collected via pre-test and post-test to determine the effects of the interventions. The findings indicated that students' writing performance of the two groups was improved; however, the holistic scores of the experimental group condition were significantly higher than those of the control group. It is worth noting that the control group also showed improvement in their writing, particularly in content, vocabulary, and mechanics. A questionnaire was utilized to determine students' attitudes toward using a digital storytelling tool in learning to write. The overall score of the questionnaire indicates that students' perceptions in the experimental group are more positive than those of the control group. Finally, some implications and recommendations are also included.**

***Index Terms*—digital storytelling, Vietnamese EFL students, writing performance, students' attitudes, mind-mapping**

I. Introduction

Writing is a crucial part of language learning, requiring students to work hard and practice to reach a certain level of proficiency (Abdel-Haq & Ali, 2017). According to Maghsoudi and Haririan (2013), writing can help students focus, organize their ideas, and improve their synthesis, analysis, and critical capacity. It can also excite their cognitive processes, providing an intellectually stimulating experience. Kellogg (1999) states that writing is a crucial skill since it allows students to portray their personalities, create interpersonal relationships, enhance their cognitive skills, and offer valid and appealing arguments. Considering the importance of writing, using efficient instructional techniques is essential to support students in developing this skill (Blasco, 2016). As a result, teachers must be able to use a range of strategies in class to assist students with the writing process (Cahyati & Madya, 2019).

DST is one technique that EFL instructors use to enhance their students' writing performance. Yamac and Ulusoy (2016) state that DST is a powerful educational technique to assist learners in enhancing the quality of their writing by helping them better organize their ideas, use words, and use fluent sentences. Duman and Göcen (2015) emphasize that DST encourages students to improve their creative writing skills as well as their ability to use language and grammar effectively. Considering the above factors, the application of DST was reported to enhance students' writing performance and boost students' drive, self-assurance, and narrative writing (Abdel-Hack & Helwa, 2004).

Vietnamese EFL students at a university in the Mekong Delta had time to study writing skills in high schools. However, Nguyen and Rijlaarsdam (2023) confirmed that students still experience specific challenges for a wide range of causes. First, students find writing boring and have little interest in it since they believe writing is a difficult skill for expressing their ideas. Second, students frequently struggle with how to start, develop, and determine the order of the occurrences in a story. Then, students generally lack vocabulary for different kinds of texts, including narrative, descriptive, report, process, and recount texts. Finally, they struggle to use grammar correctly in their writing.

II. Literature Review

A. Definitions of Writing

Writing is the most important skill for students in learning a language (Dhanya & Alamelu, 2019). According to Richards and Schmidt (2013), writing requires several key steps: planning, drafting, reviewing, and editing. Several strategies for teaching writing in first and second languages encourage students to take these steps. Raimes (1983) indicated that writing has several benefits, encompassing the reinforcement of vocabulary, idioms, and grammatical structure taught to students. Additionally, while writing, writers have the opportunity to be creative with language. Hence, writing is a unique method for ensuring that students remember what they have learned since it pushes them to utilize the language they are learning and to try to express their points of view.

B. Writing Performance

According to Hamp-Lyons (2003), a direct writing assessment is a performance-based exam that incorporates the writer, assignment, raters, and rating method, with scoring rubrics serving as a crucial sub-component in the assessment of writing. Metruk (2018) stated that the evaluation of writing quality can be divided into three broad categories: holistic (assigning a single subjective score), analytical (using multiple forms of subjectivity to obtain a score), and objective (examining a score and analyzing the prevalence of linguistic elements). According to Haswell (2014), several different scales are used to evaluate writing. Inheriting the standard writing scale used for writing assessment was initially designed by Jacobs (1981). It was applied to evaluate students' writing and identify any differences in pre-test and post-test scores between the two groups. Therefore, the researchers decided to adapt the rubrics of Jacobs (1981). The writing scale specifies the five component sections: content, organization, vocabulary, grammar and mechanics. Each scale component is divided into four bands: excellent, good, average, and poor.

C. Narrative Writing

According to Abdalla and Adam (2015), writing about events, unique experiences, whether real or fictional, is referred to as narrative writing. Similarly, Westby and Culatta (2016) define writing a narrative as the act of telling a story or providing information about a specific event. Bruner (2004) stated that narrative writing is extremely essential in our lives since it helps learners develop their creativity and transcend cultural divides. Tompkins (2008) added, the five essential elements of narrative writing are plot, setting, characters, theme, and point of view.

D. Reasons for Choosing DST and MM as Treatments for the EG and CG

DST and MM are considered effective techniques for improving writing ability (Castillo-Cuesta et al., 2021). To investigate the impact of these two techniques on writing ability, this study employed DST as an intervention for the EG and MM as a treatment for the CG. Apart from the above-noted similarities, both groups nonetheless exhibit some distinct differences.

By definition, DST and MM are unique visual aids that captivate learners and help them write more vividly (Abd Karim & Mustapha, 2022). However, while DST involves audio, MM does not (Burgess-Allen & Owen-Smith, 2010). In terms of skills, both DST and MM help learners develop communication skills and foster collaboration by working in groups (Betancur & King, 2014), while MM requires a more time-consuming handwriting process (Villalon & Calvo, 2011).

In terms of organization, DST and MM encourage students to organize and express their ideas and knowledge in an individual and meaningful way. With the help of DST and MM, students comprehend the organization of stories through the processes of reflection, editing, and feedback (Saori, 2020). However, compared to DST, MM is more complex and challenging for students to comprehend (Palioura & Dimoulas, 2022).

In terms of content, DST and MM provide learners with high-quality learning content (Rezapour-Nasrabad, 2019) and stimulate students' life experiences (Kim & Li, 2021). For fluency, DST and MM strengthen the writing process, increase the number of words and exact sentences (Yamac & Ulusoy, 2016). However, MM is a relatively traditional technique, while DST utilizes information technology and receives increasing attention (Bumgarner, 2012). Generally, both DST and MM are considered viable techniques for improving writing performance.

E. Process of Creating a DST

There are four primary phases to the DST procedure. The first phase is pre-production, which includes the process of developing a story idea, creating a storyboard and preparing for script narration and production materials. The second phase is production, which entails converting story ideas into digital media elements as outlined in the storyboard. The third phase is post-production, which encompasses finalizing the DST procedure and editing multimedia assets (audio, video, and photos). The last phase is distribution, which involves sharing stories with the public via the web or digital media (Hussain & Shiratuddin, 2016). After that, students import all their collected images and sounds into a multimedia product, such as Photostory 3, Movie Maker, ProShow Producer, or Apple iMovie. In this step, learners can adjust the sequence of the photographs. Students can share their finished digital stories with friends and teachers for feedback when they are complete, and save them as video clips.

F. Using Photo Story 3 as a DST Platform

Tsou et al. (2006) recommend that it is preferable to use websites over software programs, as both students and teachers can readily access generated tales without worrying about software installation and upgrades. Learners can use multimedia software such as Photostory3, Movie Maker, ProShow Producer, Animoto, and Apple iMovie to create their tales. According to Thesen and Kira-Soteriou (2011), Photostory3 is a software package designed to generate digital stories that are easy to use, providing users with offline access. Sheneman (2010) asserts that students may make videos by using stationary photos. Rossiter and Garcia (2010) also point out that it is significantly easier to combine the components required by the storyteller, such as images, music, and script, to make the tale successful. Thesen and Kira-Soteriou (2011) advise students to arrange images, music, and story before beginning to use Photostory3 and outline the fundamental processes to create their digital stories as follows:

Step 1: Writing a new narrative or revise an existing one
Step 2: Importing and arranging images
Step 3: Giving the imported images a title
Step 4: Narrating images and customizing motion
Step 5: Incorporate background music
Step 6: Saving the narrative

Figure 1. Photo Story 3

Teachers and students may now construct their own stories using various multimedia tools. Photostory3 is a simple software program that was selected and utilized for this research study.

G. Students' Attitudes Toward Using a DST Tool in Learning to Write

Attitudes may be defined as a mentality or a proclivity to behave in a specific way, resulting from temperament and personal experience (Schuman & Johnson, 1976). Verplanken et al. (1998) assert that attitudes are comprised of three components, namely cognitive, affective, and behavioral. Cognitive attitude encompasses ideas and thoughts about an entity, person, behavior, event, or knowledge (Jain, 2014). This component has a significant impact on learning, as it is related to the mind, specifically perception. Affective attitude contains a person's sentiments and emotions about an item (Dijker, 1987). Behavioral attitude refers to an individual's behaviors or capacity to do a specific activity in a given scenario (Bentler & Speckart, 1979). This influences a person's preferences, such as whether they are for or against, like or detest something.

H. Related Studies

First, Castillo-Cuesta et al. (2021) examined the effects of DST on the writing skills of pre-service EFL teachers. This study used a mixed-method approach and included 101 students enrolled in four distance courses for the English Major at a private university in Ecuador. The key findings suggest that students' writing abilities improved significantly, especially in grammar and vocabulary. Furthermore, DST was seen as an efficient technique for encouraging students to participate in activities to exhibit their knowledge when constructing narrative projects.

Second, Duman and Göcen (2015) carried out a study to investigate the effect of the DST on students' creative writing skills. In this study, the EG was assigned using DST, while the CG was assigned through PowerPoint presentation-based instruction. A pretest-posttest CG design was employed. As a result of the analyses conducted on the post-test scores of the EG and CG, a meaningful disparity in favor of the EG was recognized, indicating that the DST technique is a comprehensive tool for improving students' creative writing skills. The technique not only contributed to students developing original ideas, thinking fluently and flexibly, using words accurately, and mastering sentence structures, but also provided organization and helped them use styles and grammar correctly. However, this study primarily examines

the improvement in the mean scores of pre-test and post-test for the EG and CG across three components: content, language, and vocabulary. Students' attitudes before and after the intervention have not been examined yet.

Then, Rong and Noor (2019) attempted to implement a DST tool in teaching Writing for English Form 1 and identified the elements of the DST tool that might promote students' writing skills. The findings indicate an improvement in students' performance after four treatments using the DST tool. After using the DST tool, the respondents consistently applied six elements: 'Overall Purpose of the Story', 'Dramatic Questions', 'Choice of Content', 'Pacing of the Narrative', 'Quality of the Images', and 'Good Grammar and Language Usage'. Furthermore, there is an improvement in the post-test marks of respondents after four treatments of using Storybird. The study indicates a relationship between components of DST tools employed across the four treatments and students' writing performance in the post-test. All components demonstrate a meaningful relationship with students' writing outcomes, with the exception of the element 'Dramatic Questions'.

Choo and Li (2017) explored the use of digital writing to improve students' essay writing skills and their motivation to write and share ideas. Through utilizing qualitative data that encompassed analysis of students' written work, reflective journals, and interviews, the study demonstrates a marked preference for digital writing over traditional print-based approaches. The findings uncover that digital writing enhances the essay writing skills among student teachers. Additionally, students' presentation and essay writing quality are remarkably improved. Hence, the student's work showed improvement in the aspects of language use, organization, and specifically in writing content. The approach of digital writing encouraged students to engage in a more collaborative writing process with others, thereby contributing to a collaborative learning environment and enhancing their motivation to write. It is suggested that this approach is considered an effective alternative to teaching English writing to students.

Goestina et al. (2022) attempted to describe the ambiance of improving students' story-writing abilities with the usage of DST. The authors collaborated to develop the lesson plans, execute the tasks, record their observations, and analyze the results. The data was collected through classroom observations, interviews, questionnaires, and assessments. DST helped students improve their story-writing skills in four areas: topic, organization, vocabulary, grammar, and mechanics. The survey findings also indicate that students are willing to provide favorable feedback on the use of DST in writing instruction.

Tajeri et al. (2017) investigated the benefits of using DST in language classes at higher education institutions. A quasi-experimental design of the pre-test and post-test was employed with a sample of 20 postgraduate students and research scholars enrolled in two English classes. Qualitative data were collected to evaluate the effectiveness of DST in learning, encompassing responses to the questionnaire and student interviews' recordings. The data collected were analyzed using descriptive analysis and qualitative content analysis. The findings illustrate that students were satisfied with DST and perceived significant learning gains, particularly in their writing skills, and improved their vocabulary at a high level.

Finally, Zarei and Navidinia (2024) aimed to uncover the influence of DST on boosting EFL students' writing skills and investigate their perceptions of this learning strategy. Data were gathered from students' writings and a questionnaire. The results showed a substantial difference between the students' pre-test and post-test writing scores, confirming the effectiveness of DST in teaching EFL writing. The study's findings demonstrated that this pedagogical method helps learners enhance their writing skills and sub-skills, including content, organization, vocabulary, language use, and mechanics, particularly in learning grammatical rules. The usage of DST may assist students in learning new words and their relevant context. Furthermore, the participants stated that DST may improve their linguistic abilities, motivation, collaboration, creativity, self-esteem, and social skills.

III. Methodology

A. Research Questions and Design

This research employs quantitative method. Two tests and questionnaires were used to answer the two research questions. The intervention time for the study is 8 weeks, from March to April, 2025. The study was conducted at a university in the Mekong Delta, Vietnam, which is fully equipped with learning facilities. This study was guided by the following research questions:

1. To what extent does DST enhance the writing performance of Vietnamese EFL students in narrative paragraphs?
2. What are Vietnamese EFL students' attitudes towards learning to write with DST?

Table 1
Research Design

Panel			
Group	**Pre-test**	**Intervention**	**Post-test**
EG		Digital storytelling treatment	
CG	Pre-test Pre-questionnaire	Mind map treatment	Post-test Post-questionnaire

B. Participants

Fraenkel et al. (2012) proposed that convenience sampling is choosing a group of participants based on their willingness to participate in the study. Likewise, Obilor (2023) claimed that convenience sampling involves selecting readily available

individuals. As convenience sampling is less expensive and more convenient than other sample approaches, it is frequently chosen by researchers. Recognizing the benefits of using convenience sampling, the researchers selected 53 university students from various majors attending the General English course. They originate from provinces in the Mekong Delta of Vietnam. They are between 19 and 25 years old and in their second year of a four-year bachelor's degree program at the university. Some participants passed the national university entrance exam and are now pursuing their studies uninterrupted, from high school to university. In contrast, other learners finished their high school programs 2-3 years ago, then took temporary jobs or served in the military and returned to the university to pursue their undergraduate studies.

C. Instruments

Writing tests

This study engaged the students in a pre-test and a post-test. Each test lasted 60 minutes. The pre-test was used to assess the students' writing performance before the intervention, demonstrating their commitment to the research. After the intervention, students were given a post-test to assess the improvement in their writing performance. These two narrative writing tests, designed to align with the course content, served a specific purpose in the study. Both tests were carefully selected from the book, "Preliminary English Test" (PET) by Cambridge University Press, to ensure their relevance and reliability in assessing writing performance.

Questionnaire

A questionnaire was created to assess students' attitudes toward learning to write in English. There are 19 questions on the survey, and the 5-point Likert scale, which ranges from 1 to 5, was interpreted from strongly disagree to strongly agree. According to Ostrom (1969), the questionnaire can produce three different components of data about the respondents: affective attitudes, cognitive attitudes, and behavioral attitudes.

[1] affective attitudes: items 1, 2, 3, 4, 5

[2] cognitive attitudes: items 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

[3] behavioral attitudes: items 16, 17, 18, 19

TABLE 2
STUDENTS' ATTITUDES TOWARD LEARNING TO WRITE

No.	Statements	1	2	3	4	5
1	I think I like writing tasks.					
2	I think I am confident in writing.					
3	I think I am active in editing my tests.					
4	I think I am motivated in writing.					
5	I think I am encouraged to write more by myself.					
6	I think it is very challenging for me to develop content for my writing.					
7	I think writing helps me enrich my vocabulary.					
8	I think my grammatical points have been improved through writing.					
9	I think writing helps me organize ideas effectively.					
10	I think I know how to write a topic sentence.					
11	I think I know how to write supporting sentences.					
12	I think I know how to write a concluding sentence.					
13	I think writing helps me use correct spelling.					
14	I think I understand the characteristics of a good writing text.					
15	I think I can explain my ideas clearly.					
16	I think writing helps me develop my critical thinking.					
17	I think I can manage time when writing.					
18	I think I have achieved good results in my writing performance.					
19	I think I have tried my best to finish the writing task.					

D. Data Collection Procedure

The tests in the EG and CG are at the same level of PET 1, with the same format and length. The data collected were submitted to SPSS for analysis.

TABLE 3
RESEARCH PROCEDURE FOR THE INTERVENTION

Time	Research activities	
	EG	**CG**
Meeting 1	The instructor informed the course's aim and explained that data from the course would be used for research and treated confidentially.	
Meeting 2	The pre-test of 60 minutes and pre-questionnaire were delivered to both groups	
Meeting 3	**Topic 1: The best memory** "Write a narrative paragraph (80-100 words) about the first time you met your best friend"	
	Using DST platform	Using MM
Meeting 4	**Topic 2: The special day** "Write a narrative paragraph (80-100 words) about your first day at a new school".	
	Using DST platform	Using MM
Meeting 5	**Topic 3: The holiday** "Write a narrative paragraph (80-100 words) about your favorite holiday"	
	Using DST platform	Using MM
Meeting 6	**Topic 4: The adventure** "Write a narrative paragraph (80-100 words) about your most exciting adventure"	
	Using DST platform	Using MM
Meetings 7, 8	A post-test of 60 minutes and a post-questionnaire were delivered to both groups.	

Table 3 demonstrates that 53 students completed a pre-test at the beginning of the course in both groups. DST treatment is applied to the EG's students from the third to the sixth weeks of the study. During the last weeks of the study, students in both groups completed the post-tests. Additionally, the questionnaire was delivered to 25 participants in the EG at the end of the intervention to examine the students' attitudes toward learning to write using the DST treatment.

IV. RESULTS AND DISCUSSION

A. Effects of DST on EFL Students in Writing Narrative Paragraphs

Quality of Writing Before the Intervention

Inter-rater Reliability at the Pre-test of the EG

At the pre-test, data collected from the EG were assessed by two raters. The inter-rater reliability of the pre-test in the EG was .949, indicating a high level of reliability in the assessment of the two raters. The outcome revealed a statistically significant correlation ($r = .949$; $p \leq .001$) between the scores of the two raters. They are shown in Table 4.

TABLE 4
INTER-RATER RELIABILITY AT THE PRE-TEST OF THE EG

Reliability Statistics		
Cronbach's Alpha		**2 Sets of Scores at Pre-test of EG**
.949		2
	Correlation	
	Examiner 1	Examiner 2
Examiner 1 Pearson correlation	1	.914**
Sig.(2-tailed)		.000
N	25	25
Examiner 2 Pearson correlation	.914**	1
Sig.(2-tailed)	.000	
N	25	25

**Correlation is significant at the 0.01 level (2-tailed)

Inter-rater reliability at the pre-test of the CG

Table 5 indicates that the inter-rater reliability at the pre-test for the CG was .947, which represented a high level of reliability in the assessment of two raters. The result revealed a statistically significant correlation between the scores of two raters ($r = .947$; $p \leq .001$).

TABLE 5
INTER-RATER RELIABILITY AT THE PRE-TEST OF THE CG

Reliability Statistics		
Cronbach's Alpha		**2 Sets of Scores at Pre-test of CG**
.947		2
	Correlation	
	Examiner 1	Examiner 2
Examiner 1 Pearson correlation	1	.900**
Sig.(2-tailed)		.000
N	28	28
Examiner 2 Pearson correlation	.900**	1
Sig.(2-tailed)	.000	
N	28	28

**Correlation is significant at the 0.01 level (2-tailed)

Students' writing performance at the pre-test

TABLE 6
DESCRIPTIVE STATISTICS AND INDEPENDENT SAMPLE T-TEST OF THE EG AND CG AT THE PRE-TEST

Group	Test	Min	Max	Mean	SE	SD	Sig.(2-tailed)	t	df
EG (n=25)	**Pre-test**	9.00	14.00	11.44	.30	1.53	.974	.033	51
CG (n=28)		9.00	14.00	11.43	.18	.99			

Findings from the pre-test demonstrate that there is no difference between the two groups after the intervention. Specifically, students' performance in the EG was at a mean score of 11.44 (Min = 9.00, Max = 14.00), and the CG was at a mean score of 11.43 (Min = 9.00, Max = 14.00). Independent Sample T-test showed no statistical difference between the EG and the CG at the pre-test ($t(53) = .033$, $p = .974$). It is concluded that the writing performance levels of the two groups of students were similar.

Quality of Writing After the Intervention

Inter-rater Reliability at the Post-test of the EG

Table 7 shows a high level of reliability achieved by two raters in the post-test. The Inter-rater reliability of the EG is .946. The finding showed a statistically significant correlation between the two raters' scores ($r = .898$; $p \leq .001$).

TABLE 7
INTER-RATER RELIABILITY AT THE POST-TEST OF THE EG

Reliability Statistics		
Cronbach's Alpha		**2 Sets of Scores at Post-test of EG**
.946		2
Correlation		
	Examiner 1	Examiner 2
Examiner 1 Pearson correlation	1	.898**
Sig.(2-tailed)		.000
N	25	25
Examiner 2 Pearson correlation	.898**	1
Sig.(2-tailed)	.000	
N	25	25

**Correlation is significant at the 0.01 level (2-tailed)

Inter-rater Reliability at the Post-test of the CG

Table 8 presents the inter-rater reliability of the post-test in the CG, indicating a high level of reliability in the assessment of two raters. The finding showed a statistically meaningful correlation between the two raters' scores ($r = 0.886$; $p \leq .001$).

TABLE 8
INTER-RATER RELIABILITY AT THE POST-TEST OF THE CG

Reliability Statistics		
Cronbach's Alpha		**2 Sets of Scores at Post-test of CG**
.939		2
Correlation		
	Examiner 1	Examiner 2
Examiner 1 Pearson correlation	1	.886**
Sig.(2-tailed)		.000
N	28	28
Examiner 2 Pearson correlation	.886**	1
Sig.(2-tailed)	.000	
N	28	28

**Correlation is significant at the 0.01 level (2-tailed)

Students' writing performance at the post-test

TABLE 9
DESCRIPTIVE STATISTICS AND INDEPENDENT SAMPLE T-TEST OF THE EG AND CG AT THE POST-TEST

Group	Test	Min	Max	Mean	SE	SD	Sig.(2tailed)	t	df
EG (n=25)	**Post-test**	12.00	18.00	15.96	.29	1.48	.000	5.998	51
CG (n=28)		11.00	16.00	13.60	.25	1.37			

Findings from the post-test show that there is a difference between the two groups after the intervention. The student's performance in the EG was at a mean score of 15.96 (Min = 12.00, Max = 18.00), and the CG was at a mean score of 13.60 (Min = 11.00, Max = 16.00) at the post-test of writing performance. Results from the Independent Sample T-test showed a statistically significant difference between the EG and CG at the post-test ($t(53) = 5.998$, $p \leq .001$). Overall, there was a significant change in the post-test after the 4-week intervention. Specifically, the mean score of students' writing performance in the EG was significantly higher than that of the CG.

Students' Improvement on Five Components of Writing in the EG

To investigate whether there was a disparity in the mean scores of five writing components between the pre-test and post-test, the analysis was conducted using a Paired Samples T-test. The specific information is presented in Table 10.

TABLE 10
STUDENT'S IMPROVEMENT ON FIVE COMPONENTS IN WRITING AT PRE-TEST AND POST-TEST IN THE EG

Condition	Components of writing	N	Mean	SD	SE	t	df	Sig.(2-tailed)
Pre-test (EG)	**Content**	25	1.92	.95	.19	-6.592	24	.000
Post-test (EG)			3.40	.64	.12			
Pre-test (EG)	**Organization**	25	2.44	.96	.19	-3.174	24	.004
Post-test (EG)			3.24	.66	.13			
Pre-test (EG)	**Vocabulary**	25	2.16	1.02	.20	-5.023	24	.000
Post-test (EG)			3.48	.77	.15			
Pre-test (EG)	**Grammar**	25	2.40	.81	.16	-5.432	24	.000
Post-test (EG)			3.56	.65	.13			
Pre-test (EG)	**Mechanics**	25	2.52	.82	.16	.972	24	.431
Post-test (EG)			2.28	.61	.12			

Table 10 presents the mean scores reflecting students' writing performance on each component in a paragraph. A Paired Samples T-test was conducted to compare the results of the pre-test and post-test. In this assessment, the mean scores for the pre-test and post-test are analyzed across five aspects of the total score. These aspects encompass grammar, vocabulary, mechanics, content, and organization, with each element worth four marks. The results showed prominent differences when comparing the pre-test to post-test scores in the following areas: content ($t(25) = -6.592$, $p = .000$), and organization ($t(25) = -3.174$, $p = .004$), vocabulary ($t(25) = -5.023$, $p = .000$), and grammar ($t(25) = -5.432$, $p = .000$), and mechanics ($t(25) = .972$, $p = .431$). The results showed that the students in the EG demonstrated significant improvement in four components—content, organization, vocabulary, and grammar — after the treatment.

Students' Improvement on Five Components of Writing in the CG

To investigate whether there was a discrepancy in the mean scores of five components in a writing paragraph between the pre-test and post-test, the analysis was conducted using a Paired Samples T-test. The specific information is presented in Table 11.

TABLE 11
STUDENT'S IMPROVEMENT ON FIVE COMPONENTS IN WRITING AT PRE-TEST AND POST-TEST IN THE CG

Condition	Component of writing	N	Mean	SD	SE	t	df	Sig.(2-tailed)
Pre-test (CG)	**Content**	28	2.00	.54	.10	-6.112	27	.000
Post-test(CG)			3.17	.72	.13			
Pre-test (CG)	**Organization**	28	2.35	.55	.10	-.515	27	.611
Post-test(CG)			2.46	.79	.14			
Pre-test (CG)	**Vocabulary**	28	2.10	.62	.11	-3.022	27	.005
Post-test(CG)			2.78	.83	.15			
Pre-test (CG)	**Grammar**	28	2.57	.50	.09	.493	27	.626
Post-test(CG)			2.50	.69	.13			
Pre-test (CG)	**Mechanics**	28	2.39	.56	.10	-1.686	27	.103
Post-test(CG)			2.67	.66	.12			

Table 11 presents the mean scores reflecting students' writing performance on each component in a paragraph. The pre-test and post-test results were compared using a paired samples t-test, a method that allows for a direct comparison of the two sets of results. In this assessment, the mean scores for the pre-test and post-test are analyzed across five aspects contributing twenty marks. These aspects encompass grammar, vocabulary, mechanics, content, and organization, with each element being worth two marks. The results showed significant differences when comparing the pre-test scores to the post-test scores in the following areas: content ($t(28) = -6.112$, $p = .000$), and organization ($t(28) = -.515$, $p = .611$), vocabulary ($t(28) = -3.022$, $p = .005$), and grammar ($t(28) = .493$, $p = .626$), and mechanics ($t(28) = -1.686$, $p = .103$). The results showed that the students in the EG had remarkably improved in three components of writing: content, vocabulary, and mechanics.

In conclusion, a significant improvement was observed in the writing performance of the EG after the four-week intervention using DST. This improvement was notably higher than that of the CG, indicating the effectiveness of DST in enhancing writing skills.

Figure 2 provides a clear comparison of the mean scores between pre-test and post-test of the EG and CG, highlighting the noticeable difference in the EG's performance.

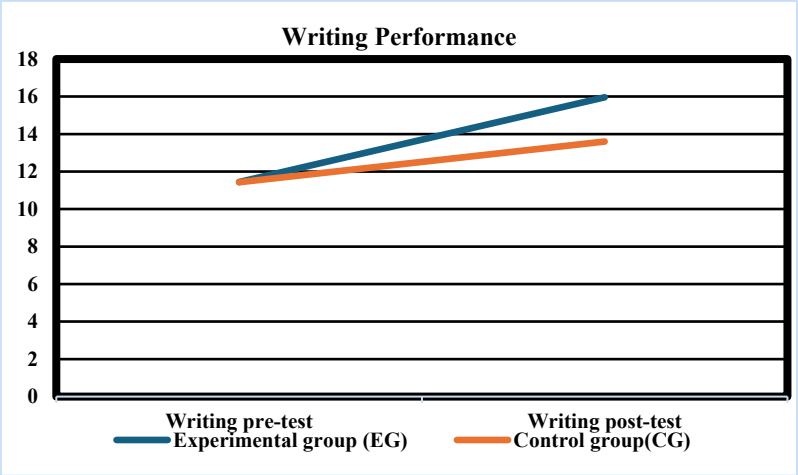

Figure 2. Students' Writing Performance With the Mean Scores of the Pre-Test and Post-Test of the EG and CG

B. Attitudes of Vietnamese EFL Students Toward Learning to Write

Results of the Questionnaire

Before and after doing the pre-test and post-test, students in two groups received the 5-point questionnaire with 19 items. The survey covered 25 students who used DST intervention and 28 students who attended MM treatment. The 5-point Likert scale, ranging from "strongly disagree" to "strongly agree," was analyzed to evaluate participants' responses.

Independent Samples T-test on the Questionnaire of Two Groups at Pre-test and Post-test

In response to the second research question, the Descriptive Statistics Test was utilized to calculate the overall mean scores of the students' attitudes toward learning to write in two groups. The mean scores of the questionnaire for the two groups at pre-test and post-test were measured to determine whether the students had positive attitudes toward learning to write.

TABLE 12
INDEPENDENT SAMPLE T-TEST ON THE QUESTIONNAIRE OF TWO GROUPS AT PRE-TEST AND POST-TEST

Stage	Group	Mean	df	Sig.(2-tailed)
Pre-questionnaire	Experimental group (n=23)	1.45	49	.119
	Control group (n=28)	1.37		
Post-questionnaire	Experimental group (n=25)	7.73		.000
	Control group (n=28)	4.05		

As shown in Table 12, the overall mean scores of the pre-test questionnaire were 1.45 and 1.37 in the EG and CG, respectively. The mean score of the post-test questionnaire of the EG was 7.73, and that of the CG was 4.05. This was followed by the Independent Sample T-test to evaluate whether the two groups had a similar level of attitudes toward learning to write before the treatment. The results indicated that there was no statistically significant difference in the mean scores of the students' attitudes toward learning to write in both groups before the treatment. Specifically, students in the EG (M=1.45) scored nearly the same as those in the CG (M=1.37). The value of Sig (2-tailed) at the pre-test was .119, which was greater than p=.05. Thus, it was indicated that the students in the EG and CG had the same attitudes toward learning to write before the four-week intervention.

After the intervention, the Independent Sample T-test was also used to investigate whether there was a statistically meaningful difference in the mean scores of the two groups in attitudes toward students' learning to write. The results showed that the mean score on the post-test of the questionnaire for the students in the EG was 7.73, significantly higher than the control group's 4.05. This difference, indicated by a Sig. (2-tailed) value of .000, lower than the *standard p*=.05, underscores the positive impact of the intervention. It is evident that the EG's attitudes toward their learning to write were dramatically higher than those of the CG.

Paired Samples T-test on the Questionnaire of Two Groups at Pre-test and Post-test

As can be seen in Table 13, the Paired Samples T-test was utilized to examine the development trend of each group.

TABLE 13
PAIRED SAMPLES T-TEST ON THE QUESTIONNAIRE OF TWO GROUPS AT PRE-TEST AND POST-TEST

Groups	Stage	Mean	df	Sig.(2-tailed)
EG (n=25)	Pre-test	1.45	22	0.000
	Post-test	7.73		
CG (n=28)	Pre-test	1.37	27	0.000
	Post-test	4.05		

In the EG, the mean scores of the participants in attitudes toward their cognitive writing performance increased from 1.45 to 7.73, and the significance value (Sig.) (2-tailed) was .000. Similarly, the mean scores of the participants in the CG

also increased from 1.37 to 4.05, and the Value of Sig. (2-tailed) was .000. It was concluded that the students' attitudes in both the EG and CG had improved after using DST and MM in learning to write. However, the students in the EG had a significantly higher score in attitudes toward their learning to write than those of the CG.

In conclusion, the results collected from the questionnaire revealed that the use of DST and MM positively affected students' attitudes toward learning to write. However, the overall scores of the questionnaire indicates that the attitudes of students in EG are significantly more positive than those of the CG. Figure 3 also clarifies the results discussed.

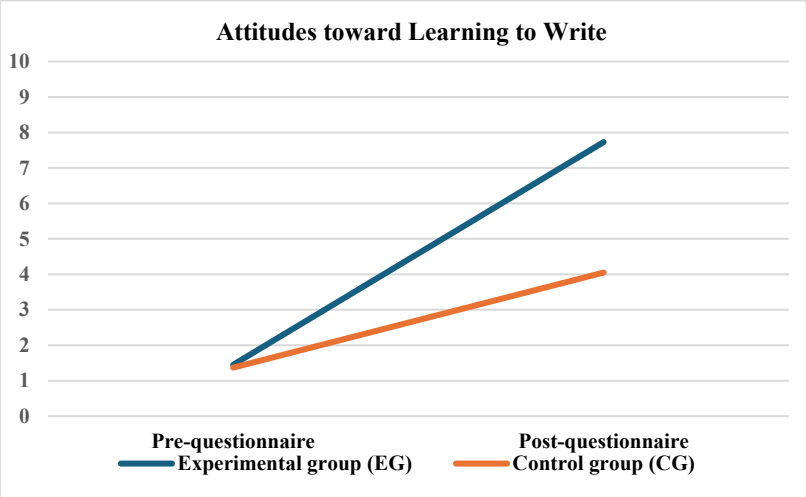

Figure 3. The Mean Scores of the Two Groups at the Pre-Test and Post-Test of the Questionnaire

C. Discussion

Effects of DST on EFL Students in Writing Narrative Paragraphs

Regarding the effects of DST on narrative writing, the results of the written texts in this study are consistent with the findings of previous research, which show that DS enhances narrative writing performance (Duman & Göcen, 2015; Rong & Noor, 2019). To discuss further, it was also found that the four components of writing—content, organization, grammar, and vocabulary — have improved after treatment with DST.

In terms of content, the findings of this study are consistent with those of Duman and Göcen (2015), who claimed that DST helps encourage students to generate creative ideas and contributes to their development of original ideas in writing, thinking fluently and flexibly, and using words accurately. The findings of the positive effects of DS on ideation also align with the results of Choo and Li (2017), who indicated that the participants' writing quality improved, particularly in the content of their writing. In terms of organization, the findings of this study align with those of Duman and Göcen (2015) who believed that DST is efficacious in improving organizational performance and that DST enhances students' organization by helping them comprehend the structure of stories through the processes of reflection, drafting, and feedback. In terms of grammar, the findings of this study also coincide with the research results of Rong and Noor (2019), who reported that DST can have a positive effect on students' writing, particularly in the area of "Good Grammar and Language Use". Similarly, Castillo-Cuesta et al. (2021) indicate that DST had a positive impact on the writing skills of EFL higher education students, as the participants in the EG showed a significant improvement in grammar. In terms of vocabulary, this research result corresponds with the research of Tajeri et al. (2017), who confirmed that using DST helps learners improve their vocabulary knowledge.

In contrast, this study showed no significant improvement in the mechanics of the EG after using DST in learning to write. As a result, this study differs from that of Zarei and Navidinia (2024), who state that DST improves students' writing mechanics. In the same vein, Goestina et al. (2022) report an improvement in students' writing mechanics after using DST as a treatment.

Students' Attitudes Toward Using a DST Tool in Learning to Write

Regarding the attitudes of DST on narrative writing, the results of the questionnaire in this study revealed that the attitudes of students in the EG are significantly more positive than those of the CG. This finding aligns with that of Goestina et al. (2022), who reported that students exhibit positive attitudes toward using DST in learning to write following the treatment. Similarly, this result aligns with the findings of Zarei and Navidinia (2024), who reported a substantial difference between the students' pre-test and post-test writing scores, confirming the efficacy of DST in teaching EFL writing.

V. Conclusions

A. Findings

This study yielded important findings regarding the effects of DST on narrative writing among Vietnamese EFL students. The main findings indicate that the students' writing performance in both groups improved; however, the holistic score of the EG was significantly higher than that of the CG. Regarding aspects of writing, while the EG improved in content, organization, grammar, and vocabulary, students in the CG showed improvement in content, vocabulary, and mechanics. This comprehensive improvement underscores the effectiveness of the DST in enhancing paragraph writing.

The analysis of the questionnaires shows that students in the EG and CG had similar attitudes toward learning to write before the intervention. After the treatment, the students' attitudes in the EG were significantly more positive than those of the CG. Therefore, DST is claimed to be an efficient tool for improving students' writing in narrative paragraphs.

B. Implications

First, the teachers can create a detailed schedule to ensure that the students have completed their work using a DST platform. The most important thing is for teachers to provide clear directions on what each student has to do while writing at home using a DST platform. Second, teachers should exercise caution when utilizing this technological tool, as improper usage or integration of this methodology may cause issues in the classroom, particularly for students who have limited access to technology and, therefore, limited experience using it in their daily lives. Third, teachers should receive training on using DST before applying it in the classroom to avoid making it too overwhelming. Students who receive writing instruction perceive writing as more fascinating and inspiring than those who receive traditional writing instruction. These are two constructs to develop the skills in question.

Finally, teachers should never forget that, with the DST technique, the writing process is more significant than the use of multimedia elements. Before using such an application, teachers or school administrators should create a detailed plan. This plan should include the necessary time, the objective of the implementation, alignment with curricular goals, assessment challenges, and the necessary equipment. A well-thought-out plan is crucial for a successful implementation. Without it, the implementation may not yield the desired results. However, with a well-planned and supervised implementation of this methodology, DST proves to be a valuable tool for educators. It allows them to transform traditional writing classes and introduce composition classes to 21st-century multimodal literacies, thereby enhancing the learning experience for students.

C. Limitations and Recommendations for Future Research

One limitation of the study is the similarity in format between the pre-test and post-test, which may have contributed to improved performance on the post-test due to participants' increased familiarity with the format. To mitigate this effect, future research should consider employing a post-test with a different structure or format. It is recommended that additional research be conducted with a larger number of participants and a more effective sampling approach. Furthermore, future researchers are encouraged to extend the study's period. For future studies, the researchers advise that the intervention program be given more time to determine if it produces better results. Moreover, there is an urgent need for more research to determine the effect of DST on various types of writing, such as persuasive, expository, journal, and letter writing.

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