



The effect of digital storytelling on learners' receptive and productive vocabulary knowledge

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Abstract

This study aimed to assess the impact of digital storytelling on learners' receptive and productive vocabulary knowledge. For this purpose, 48 participants with intermediate English proficiency were divided into two equal groups: control and experimental. After conducting the pretest, implementing the treatment for the experimental group, and administering the post-test, the results indicated progress in both groups. However, the experimental group performed significantly better than the control group. In addition, the analysis of the experimental group's scores in the post-test revealed that digital storytelling helped learners perform better on productive words than on receptive ones. The findings could be beneficial for the instructors, institutions, and learners.

Keywords: digital storytelling, receptive, productive, vocabulary knowledge

Introduction

Proficiency in vocabulary is indispensable for second language (L2) learners, as it indicates their understanding of the original language. The mastery of vocabulary is the ability to recognise and transmit the significance of a term (Hiebert & Michale, 2005, as cited in Dalimunthe & Haryadi, 2022). Anggara (2023) emphasised the importance of vocabulary knowledge in teaching any language skill to L2 learners. The process or ability to recognise things is facilitated by vocabulary. This is especially true for written and oral resources (Viera, 2017). In addition, learning an L2 necessitates knowledge of vocabulary. Apart from being the most critical element for accurately understanding and utilising language, vocabulary is also an aspect of language whereby a large percentage of students create errors (Segler et al., 2002). Hasan and Selamat (2017) conducted research indicating that vocabulary tasks were the fourth most frequently used activity among the nine activities examined to evaluate the frequency of teaching languages in English as a second language (ESL) classes.

Nation (1994) and Al-Dagel (2009) categorised vocabulary into two broad categories: receptive vocabulary and productive vocabulary. Receptive vocabulary is the vocabulary that learners can comprehend while reading or listening. Productive vocabulary is the words that learners can produce and use when speaking or writing to express their ideas. It is stated that learning receptive vocabulary is easier than learning productive vocabulary. A correctly produced word indicates correct pronunciation, spelling, grammatical structure, and connected discourse.

Receptive vocabulary is the foundation of language proficiency and its acquisition (Sun & Yin, 2020). Through extensive reading, exposure to authentic materials, and meaningful use of the target language, one can develop receptive vocabulary skills (Webb & Nation, 2017). Productive vocabulary, on the other hand, refers to the degree to which words are used and produced accurately and appropriately in context during actual communication (Nation, 2022). This includes the ability to comprehend the meanings of words and retrieve and use them accurately in appropriate situations (Nation, 2019).

The learning and effective use of academic vocabulary are crucial to the development of academic literacy among university students (Coxhead & Nation, 2018). A strong understanding of academic vocabulary enables students to comprehend complex academic texts and grasp the discourse of their subjects (Green & Lambert, 2018). At the same time, abundant productive knowledge enables students to articulate their opinions effectively in academic writing, oral presentations, and learning communities. The precise and contextually valid use of the subject area's lexicon enables students to express sophisticated ideas, engage in academic discussions, and establish a scholarly identity (Hyland, 2013). Hence, receptive and productive vocabulary are equally crucial to English language learners in general, particularly in academic settings. Receptive proficiency supports the understanding of academic material, and productive proficiency enables cogent and self-assured expression.

One of the numerous challenges that English students face is their mastery of vocabulary (Anggara, 2023; Jahedizadeh et al., 2025). According to Nation (2013), students' proficiency in vocabulary used hinders their ability to master the language effectively. The acquisition and instruction of language have never been straightforward. Students and teachers alike are confronted with this substantial obstacle (Anggara, 2023). It is essential to select the appropriate technique, method, or approach when teaching vocabulary. According to Halliwell (1992), numerous techniques, methods, and approaches are available for teaching vocabulary. Utilising information and communication technology-based techniques for educational purposes has become an increasingly prevalent trend, and has been demonstrated to substantially enhance learners' motivation (Outamgharte et al., 2025). With recent developments in educational technology, mobile-assisted learning has been found to be a promising approach for developing receptive and productive vocabulary in university learners (Uğraş et al., 2024; Xodabande & Boroughani, 2023; Xodabande et al., 2022). Technological advancements have significantly impacted resources for education, techniques, practices, and approaches (Alibakhshi et al., 2025). One of the highly significant areas in which technology is being used is education (Behforouz & Frumuselu, 2021; Kormos, 2022). To enhance the longevity of learning, technology must be integrated into educational institutions, stimulating a range of sensibilities (Demirbas & Sahin, 2020). The proliferation of a wide range of educational media is a result of the swift advancement of technology. One element of this technology is the development of digital narratives. Digital storytelling (DST) enables students to broaden their knowledge by combining their English and technological competencies (Dolba et al., 2022). There are several current methods of learning words in English, and one of them is the DST method, which can be used for technology media purposes in learning (Siddiqui et al., 2010, as cited in Sembiring & Simajuntak, 2023). Research has demonstrated that providing meaningful context, multilevel

information, and the opportunity to use words in context aids in learning vocabulary (Smeda et al., 2014). According to Robin (2006), DST allows students to use new vocabulary in creating stories, thus enabling them to retain the vocabulary better. In addition, this integration of visual, aural, and written input facilitates dual coding (Paivio, 1991), and therefore enhances the retention and recall of new vocabulary.

Because it is said to stimulate creativity, develop critical thinking, ignite imagination, and even encourage moral reasoning, storytelling has attracted much attention in L2 education (Wu & Chen, 2020). By incorporating informative and communicative technology, technological developments have further enhanced conventional storytelling. DST, a type of digital narrative that has been found to be highly successful for technology-enhanced learning and constructivist teaching, is a powerful tool (Lambert, 2013). DST is a contemporary approach to storytelling that revitalises the age-old art of written or oral narrative, utilising computers and multimedia resources. DST is a good enabler of current educational methods, including technology-integrated, project-based, and student-centred learning experiences (Robin, 2016; Wu & Chen, 2020). DST has the potential to enhance several aspects of English as a foreign language (EFL) students' communication abilities (Chen, 2024). Dupain and Maguire (2005) used technology-integrated narratives inside and outside the learning environment to motivate learners to understand educational concepts and articulate their opinions and ideas. Leong et al. (2019) asserted that DST offers an educational experience that is both engaging and compelling, especially for young students and those with disabilities related to learning, by combining multimedia studies, production, and display with conventional written and communication abilities. In addition to addressing difficulties with learning vocabulary by utilising technology to link form, meaning, and usage, this creative strategy facilitates speech acquisition and retention of words by making school-learned skills relevant to the larger world (Har et al., 2019). Maya and Al Halim (2021) identified DST as a dynamic tool in primary education that provides an integrated approach to teaching language skills, including vocabulary.

According to Sulistianingsih and Aflahatun (2020), DST can significantly help expand EFL learners' vocabulary and make them feel more comfortable, motivated, and confident in the learning process. One excellent EFL activity that has been found to be a highly motivating exercise for EFL students to develop and expand their vocabulary knowledge is computer-assisted DST. DST also enables students to refine their mastery of English. Amelia and Abidin (2018) examined the impact of DST tools on language development. The study's results suggested that digital tablet stories facilitate learning English words for ESL students. In elementary education, DST has evolved as a flexible medium that offers opportunities for a multimodal approach to teaching language competencies, such as vocabulary (Maya & Al Halim, 2021). Especially suitable for young children and those with learning difficulties, DST offers an engaging and interactive learning experience that facilitates multimedia research, production, and presentation, complementing traditional reading and speaking (Leong et al., 2019). As Har et al. (2019) described, this novel method positively addresses the issue of vocabulary competence, as it, with the assistance of technology, can connect form, meaning, and usage to enhance speech proficiency and help maintain the newly acquired lexis while transferring school-based skills to the real world.

Research studies on language acquisition have attracted considerable interest for an extended time. In the Middle East, learning vocabulary is crucial, as university students preparing for international tests dedicate a significant amount of time and resources to it. For example, the IELTS (International English Language Testing System) and TOEFL (Test of English as a Foreign Language) require a significant amount of time and effort to learn a language. Students do not always use their time and effort carefully and accurately (Behforouz & Al Ghaithi, 2022).

In Oman, research has shown that students have significant difficulty with vocabulary related to both reading and writing (Al-Seyabi & Tuzlukova, 2014). Young learners in Oman generally have limited opportunities to engage in English conversation at home and have less formal exposure to the language (Al-Jardani, 2012). The learners' limited vocabulary, which is their primary means of communication in English, has led to a very unfavourable attitude toward the language. Al Maawalyia (2008) claimed that a principal issue impeding learners' effective communication in English and their overall subpar language proficiency is their poor vocabulary. Al-Mahrooqi (2012) revealed that several Omani students find the English language too challenging to master. Consequently, there has been a significant decline in the use of the language. As a result, learners would rather not study, develop, talk about, or practice the language. Instead, they would rather memorise vocabulary than understand it. Upon reviewing the research, it can be observed that several learners have a significant deficiency in English language vocabulary skills (Salim, 2019; Othman, 2018). This may arise from the need for effective tactics and approaches that facilitate more significant communication and present the English language in a genuine and enjoyable setting (Al-Tamimi, 2019; Mezied, 2017). Utilising DST as an instructional tool can effectively enhance students' vocabulary acquisition in a stimulating and engaging manner (Albishi & Alqiavi, 2022). Although DST is increasingly recognised as a valuable educational tool, research on its effectiveness in improving learning of English vocabulary from an inclusive standpoint is lacking (Belda-Medina, 2022). Therefore, this study attempts to measure the impact of DST on the receptive and productive vocabulary knowledge of Omani students. Additionally, the research aims to address the following questions through quantitative analysis.

1. Does DST affect students' learning of receptive vocabulary?
2. Does DST affect students' learning of productive vocabulary?

Literature Review

Digital Storytelling

DST integrates media with traditional storytelling to provide learners with various technological resources for creating, revising, and planning digital narratives (Normann, 2011). It is a method of storytelling that employs voice, pictures, and written text to convey a concise narrative, typically lasting 3–5 minutes (Ohler, 2010; Robin, 2008). Because of its dynamic, immersive, and compelling nature, DST is widely used as an instructional approach (Davis, 2005; Farmer, 2004; McLellan, 2007; Salpeter, 2005; Warschauer & Ware, 2008). It is an instrument for communication in an educational setting that integrates subject matter, knowledge, and capabilities from various curriculum areas. DST assists pupils in preparing for educational opportunities that involve face-to-face interaction, communication exercises, and feedback from colleagues and themselves. It can help develop self-confidence by facilitating greater accomplishments (Hung et al., 2012, cited in AlShaye, 2021). Additionally, DST establishes flexible learning environments that enable the acquisition of technical abilities and improve collaboration among learners, critical literacy, and engagement through the combination of resources (Behmer, 2005; Smeda et al., 2014). Pupils enhance their understanding of the subject matter and have a more enjoyable educational experience by crafting, refining, and presenting their narratives and reading those of their peers. DST enables learners to actively engage in their learning experience rather than merely receiving information passively, as stated by Ohler (2006). Learners experience a sense of control over their studies while developing their skills through DST, a student-centred approach. Consequently, their tutors give

learners some authority regarding their knowledge, enabling them to participate more actively. On the other hand, teachers assume a less dominant role. In conventional educational settings, learners are often not engaged or involved in the learning process when they passively listen to their instructors, who are perceived as the sole providers of knowledge. The use of DST as a method of instruction fosters students' engagement in the selection and creation of materials, the unrestricted allocation of energy and time to projects and tasks, and the direction of their own learning, as well as that of their peers.

Receptive and Productive Vocabulary Knowledge

Receptive and productive understanding, as well as linguistic aptitude, are interconnected, according to Nation (1990). In contrast to productive vocabulary, which is the capacity to generate words during spoken and written communication, receptive vocabulary is the capacity to comprehend terms while reading and listening. This definition defines productive vocabulary as an active skill, whereas receptive vocabulary is considered a passive skill. However, this assertion is inaccurate, as learners must engage in the learning process to acquire both receptive and productive lexical knowledge. Additionally, all memory, recognition, remembering, and information-gathering processes are often perceived as active processes that require learners to be cognitively engaged and participate in relevant processes to learn effectively.

In 1995, Corson used "utilisation" instead of "knowledge" to explain the same terms. Corson (1995) differentiated between active and passive lexicon in the primary language, asserting that the former relates to commonly used terms that are easier to acquire, remember, and understand. Nevertheless, the latter relates to less common linguistic elements, which are more difficult to come by and are only partly understood by the students. In addition, Waring (1997a, 1997b) asserted that receptive vocabulary relates to identifying and retaining the meaning of a term or expression in the first language. However, productive vocabulary focuses on recalling and evocating vocabulary terms in the target language. The term be modified by Laufer et al. (2004), who defined receptive vocabulary knowledge as the ability to recall the form of lexical terms, whereas productive vocabulary knowledge is the ability to recall the meaning of terms. Receptive vocabulary knowledge refers to the ability to identify a word's form and provide synonyms, whereas productive vocabulary is the ability to recall the form and meaning of a term, according to Webb (2008). It is possible to argue that these explanations are inadequate for everyday life because they only partly assess receptive and productive knowledge (Heidari, 2019).

A comprehensive description, as accurately indicated by Nation (2001), is not limited to any ability or feature of language and includes all dimensions of word knowledge in various contexts. It was also found that students' receptive knowledge cannot be easily and quickly converted into productive vocabulary. The nature of this shift remains uncertain, as previously stated. Additionally, it is essential to be aware of this distinction because of its significance in the fields of foreign language and L2 education and acquisition (Heidari, 2019).

It has a high degree of ecological validity, as noted by Schmitt (2010). Ryle (1949) stated that vocabulary production is linked to cognitive processes associated with procedures, whereas reception vocabulary is involved in declarative cognitive processes. However, no agreement has been reached, despite this distinction being discussed and understood in various ways (Paradis, 2009). Melka (1997) suggested that there is a connection between the similar mental process linked to these two types of vocabulary knowledge. According to Laufer (1998), learners progress from receptive to productive vocabulary in their lexicon learning. Furthermore, Melka (1997) found that students are more likely to learn receptive vocabulary before productive language. This suggests that learning vocabulary progresses in a single direction, from receptive

to productive. Contrary to popular belief, Zhong and Hirsh (2009) discovered that productive knowledge increases more rapidly than receptive knowledge. Similarly, Hagtvet (1982) proposed that children must constructively acquire a term before becoming receptive to it. Other studies have linked word frequency to the transition from receptive to productive mode (Laufer and Paribakht, 1998). The more frequently a vocabulary item is used, the more effectively it will likely be utilised. Unlike the case of ESL contexts, Lehmann (2007) asserts that the difference between learners' receptive and productive knowledge is more pronounced in EFL contexts. This could be because ESL settings provide students with additional opportunities to use the words they have learned receptively in a variety of real-world contexts, which aids in successful word learning. However, in EFL contexts, where such chances are limited, most words remain in the receptive mode and do not often transition to productive vocabulary. Furthermore, learners' comprehension and pragmatic word usage are enhanced when they effectively employ a word they have learned in a real-life situation. The differences in productive and receptive vocabulary knowledge found by the studies highlighted above underscore the gap between the two (Clark, 1993), and it is crucial to identify strategies to bridge this gap and help students utilise language more effectively. One way to achieve this goal and move students towards a more productive role is by allowing them to generate words that they have predominantly acquired through receptive learning (Heidari, 2019). Yamamoto (2011) employed output-oriented tasks in instruction, particularly in vocabulary, to help learners learn receptive and productive terms more effectively over an extended period. This approach encourages learners to connect the linguistic structure, meaning, and application of words, thereby enhancing their ability to internalise them. This highlights the crucial role of language production in facilitating receptive and productive vocabulary acquisition.

DST and Vocabulary Acquisition

The study conducted by Nami and Asadnia (2024) investigated the potential of collaboration in learner-generated digital stories for word knowledge acquisition and pupils' reactions to DST-based vocabulary learning experiences. A total of 146 undergraduates who were not majoring in English were divided into two control groups and two treatment groups for the research. The control groups used vocabulary flashcards, while the treatment groups collaborated to create digital narratives that included new terminology. *T*-tests were used to analyse the quantitative data from vocabulary assessments administered before and after the therapy. Qualitative information from interviews, reflection diaries, and weblog comments was analysed using the constant comparative method. The findings showed that learners who used collaborative digital systems to acquire new phrases performed better than the control groups. The results indicated that DST enabled pupils to customise their vocabulary acquisition, apply it in everyday situations, engage in peer-supported learning, and enhance cognitive–affective interaction.

In a study by Al Ghaithi et al. (2023), the impact of DST on the motivation to learn, vocabulary development, and self-directed learning (SDL) of Omani language learners was examined. Forty intermediate Omani EFL students were randomly assigned to the treatment and control arms. Both groups received regular in-person teaching, but the experimental group had additional sessions to complete DST tasks. The study employed three primary tools: a vocabulary test developed by the researcher, the motivation survey, and the self-rating score of SDL, used as pre- and post-tests. The findings demonstrated that though both groups showed increased motivation and SDL, the treatment group outperformed the control group by a small margin. The treatment group also performed significantly better on the vocabulary test. These results suggest incorporating DST may enhance vocabulary acquisition and overall language learning and encourage SDL among EFL students.

Sembiring and Simajuntak (2023) investigated DST as a potential supplement to traditional classroom instruction for vocabulary acquisition. The study employed a comparative design. The results revealed that DST aided in the vocabulary growth and development of the treatment group of learners. Students who received education through DST performed better throughout the intervention than those who did not receive such training. Additionally, the DST group held a positive view of using DST in the classroom.

Maya et al.'s (2022) study examined the perceptions of young students regarding the use of DST in vocabulary training. The research employed in-depth interviews and closed-ended surveys to investigate the application of DST in educational settings. The sample consisted of 23 fifth-graders from a primary school. The qualitative data gathered through surveys and interviews with younger children indicated that DST was a more engaging, fascinating, and motivating way to enhance their vocabulary knowledge. The findings suggest that EFL teachers should utilise appropriate digital narratives to educate and promote vocabulary development among younger learners.

Methodology

Participants

In this study, a total of 48 Omani EFL students were randomly selected from the General Foundation Programme in Oman. Although they were designated as having an intermediate English proficiency level, these students were required to study English for several semesters because they had initially been classified at the elementary level on the basis of their performance in an entrance exam given by the institution. The student population consisted of both male and female learners, with ages ranging from 19 to 20. Arabic was their main language. The students were divided into two equal groups: a treatment group and a control group, each comprising 24 students. These learners had previously demonstrated enduring difficulties in both receptive and productive vocabulary knowledge, particularly in reading and speaking abilities, as evidenced by evaluations from their English language instructors and placement examinations.

The foundation program is a one-year program divided into three consecutive academic semesters. The university requires all students to complete the foundation program before commencing their studies in higher education specialisations. Students study English, mathematics, and information technology during this mandatory foundation year. The characteristics of the participants align with those of typical Omani EFL learners at general foundation programmes around the country, allowing for the outcomes of this study to be judiciously generalised to other educational contexts in Oman.

Research Instruments

A number of instruments were utilised in the data-gathering process, as described in the following subsections.

Vocabulary Knowledge Tests

The investigators conducted a single set of tests, including both a pretest and post-test, to track the development of the participants and assess the impact of DST on their receptive and productive vocabulary knowledge. Each test consisted of two tasks, each comprising 10 questions. The initial task focused on the student's receptive vocabulary and consisted of multiple-choice questions. These questions covered the vocabulary from the intermediate students' university syllabus. In this part, students were presented with a statement containing a missing word and

four alternative options. They had to select the correct word to complete the statement from the options.

The second task focused on acquiring productive vocabulary knowledge and consisted of two components: translation and fill-in-the-blank exercises. The first component included questions with five blanks. There were two passages, each consisting of 60 words. Five words were omitted from each passage. Each passage had a box with eight words, three of which were distractions. The students used these words to fill in the blanks in the passage. The second component involved translation. In this section, learners were required to translate five terms from Arabic to English using a table that included the category of each word.

The reliability of these assessments was evaluated through a pilot study conducted at the same university where the research project took place. The pilot study involved 25 Omani EFL students with an intermediate English proficiency level. Table 1 below presents the reliability results for the two sets of tests.

Table 1. The results of the reliability for pretest and post-test.

Cronbach’s alpha	Cronbach’s alpha (standardised items)	N
0.792	0.834	2

Table 1 shows a Cronbach’s alpha score of 0.792, indicating that the two items are internally consistent enough to demonstrate that they consistently measure the same underlying idea. After standardisation of the items, the dependability increases slightly to 0.834, suggesting that changes in item size or variance may affect consistency. This level of reliability is considered good because only two items were used, and achieving high alpha values with a small number of items is usually more challenging. To ensure validity, the tests were administered to two Omani Applied Linguists with PhD degrees and 15 years of teaching experience in the Foundation Program at the same university.

Procedure

The investigation took place in the autumn semester of 2024. Participants were informed that their participation was voluntary. A vocabulary knowledge pretest was administered one week prior to the start of the treatment. The experimental group supplemented traditional instruction with extra vocabulary practice outside the classroom using DST, whereas the control group learned vocabulary through conventional instruction.

Before starting the experimental phase, the treatment group attended a session focused on producing DST. During this session, the components of DST, the programs used to create them, and the construction method were explained to the students. The experimental phase lasted for one month. In the experimental group, students generated three digital articles. They were given various video editing applications, including PowerPoint, VivaVideo, WeVideo, Capcut, Windows Movie Maker, and OpenShot. The instructor also provided URLs to websites containing noncopyrighted sounds and images, and detailed instructions on creating a digital narrative. The study focused on 30 vocabulary terms, with 10 of them related to a specific subject taught over three weeks. While constructing the digital narrative, learners dedicated 10 words to each topic from the university syllabus. The topics included personal choices, risks and administration, and various perceptions. Concurrently, in the control group, the participants were also

instructed to produce three articles, but without making any digital resources available. In both groups, the researchers were responsible for teaching the words, guiding the students, and providing feedback to them.

At the beginning of the treatment, the control and experimental groups were presented with the first 10 terms of the first topic, “different perceptions,” in a classroom setting. However, the experimental group was required to compose an initial draft of a short narrative using 10 words related to the topic outside the classroom. The instruction lasted for two hours each day, during which the researcher taught the groups the 10 words. After the class, each student had to create a digital narrative using the 10 words, incorporating images, text, and audio. The investigator encouraged the treatment group students to create digital stories outside of the classroom using their mobile devices or lab computers. The students then submitted the first draft of their digital stories, which included images, audio, and text, for feedback during the second class period before starting the final draft. The teacher instructed the students to modify their second draft on the basis of the feedback received. Once the subsequent revision of their short narrative was completed, the treatment group students received approval from the teacher. They then developed digital stories by adding multimedia elements and English subtitles in the lab or at home. If the students encountered any issues, they were advised to seek help through Microsoft Teams. Each learner presented their completed digital stories to the class the following day. The investigator discussed the students’ work and asked questions. The same procedure was repeated for the remaining words. The goal of these activities was to improve productive vocabulary knowledge by having students write and deliver stories. At the same time, continuous exposure to new vocabulary in different multimedia formats helped the students improve their receptive vocabulary skills.

The students in the control group had two hours of lessons every day on the same set of vocabulary words. Instead of digital stories, these students wrote pieces in the target language using only traditional tools, such as textbooks, dictionaries, and printed notes. They submitted their first drafts to their teachers without any multimedia. The teacher provided written comments at the next session and instructed the students to make the necessary changes to their work. The finished stories were sent in for grading, and students read their stories out loud in class without using any digital tools. The technique was applied to the second and third sets of vocabulary words related to the same subjects as those given to by the experimental group. A vocabulary knowledge post-test was administered to the control and experimental groups in week 4.

Data Analysis

Before proceeding to the main variables of the study to measure the impact of treatment on them, it was necessary to run a normality test to select the appropriate parametric or nonparametric test. Table 2 below shows the results of the normality test.

Table 2. Results of the Kolmogorov–Smirnov normality test.

	Statistic	df	Sig.
Pretest	0.244	48	0.000
Post-test	0.151	48	0.008

Table 2 shows a considerable departure from normality, as indicated by the findings of the Kolmogorov–Smirnov test, which yields a test statistic of 0.244 for the pretest, with a *p*-value

below 0.001. For the post-test, the test statistic is 0.151, with a *p*-value of 0.008. Both *p*-values, below the conventional alpha threshold of 0.05, indicating that we should reject the null hypothesis of normality for both datasets. To continue running the comparison tests, nonparametric ones were appropriate and valid in this case. Table 3 below presents the Wilcoxon signed-rank test results for the control group between the pretest to the post-test.

Table 3. Wilcoxon signed-rank test for a comparison of pretest and post-test results within the control group.

Post-test – pretest	
Z	−4.899
Asymp. Sig. (2-tailed)	0.000

Table 3 shows a Z score of −4.899 and a *p*-value (two-tailed asymptotic significance) of less than 0.001, indicating a significant difference between the scores before and after the test in the control group. More precisely, this outcome indicates that the intervention had a notable and beneficial effect, resulting in a substantial improvement in the post-test scores compared with the pretest levels. Table 4 compares the results of the pretest and post-test for the experimental group.

Table 4. Wilcoxon signed-rank test for a comparison of pretest and post-test results within the experimental group.

Post-test – pretest	
Z	−4.899
Asymp. Sig. (2-tailed)	0.000

Table 4 yielded a Z value of −4.899 and a very significant *p*-value (two-tailed asymptotic significance) of less than 0.001. This outcome demonstrates a significant disparity between the results obtained before and after the test in this group. This notable alteration highlights the effectiveness of the intervention, suggesting that it had a positive impact on the assessed results. Since both groups’ scores increased in the post-test, a Mann–Whitney U-test was performed to compare the two groups and determine which one performed significantly better than the other. Tables 5 and 6 present the results of comparing the pretests and post-tests of the two groups together.

Table 5. The descriptive statistics of both groups in pretest and post-test.

Groups		N	Mean rank	Sum of ranks
Pretest	Control	24	23.10	554.50
	Experiment	24	25.90	621.50
	Total	48		
Post-test	Control	24	13.58	326.00
	Experiment	24	35.42	850.00
	Total	48		

Table 6. Mann–Whitney U-Test for comparing both groups in the pretest and post-test.

	Pretest	Post-test
Mann–Whitney U	254.500	26.000
Wilcoxon’s W	554.500	326.000
Z	−0.713	−5.493
Asymp. Sig. (2-tailed)	0.476	0.000

Table 5 and Table 6 show that there is no statistically significant difference in the pretest results between the control group (mean rank = 23.10) and the experimental group (mean rank = 25.90), as indicated by a Mann–Whitney U-value of 254.500 and a *p*-value of 0.476 (*p* > 0.05). However, the post-test findings reveal a considerable disparity between the control group (mean rank = 13.58) and the experimental group (mean rank = 35.42), as indicated by the Mann–Whitney U-value of 26.000 and a very significant *p*-value of less than 0.001 (*p* < 0.05). This suggests that the experimental intervention had a substantial effect on the participants’ scores, resulting in a notable improvement in the experimental group compared with the control group. To learn more about the experimental group’s performance in terms of productive and receptive vocabulary, Table 7 below presents the results of the marginal homogeneity test.

Table 7. The marginal homogeneity test comparing receptive and productive knowledge of experimental group.

	Receptive and productive
Distinct values	9
Off-diagonal cases	24
Observed mean height (MH) statistic	86.0
Mean MH statistic	122.0
Std. deviation of MH statistic	7.348
Std. MH statistic	−4.899
Asymp. Sig. (2-tailed)	0.000

Table 7 demonstrated a substantial disparity between the two categories of vocabulary scores, as evidenced by the standard mean height statistic (*Z*) of −4.899 and a highly significant *p*-value of less than 0.001. The dataset consists of 9 unique values and 24 occurrences where the values are not on the diagonal. The observed mean height is 86.0, while the average MH is 122.0, with a standard deviation of 7.348. The results indicate that the scores for productive vocabulary were considerably higher than those for receptive vocabulary in the post-test, showing a notable improvement in productive vocabulary following the intervention.

Discussion

This paper investigates the effect of DST techniques on Omani undergraduates to enhance receptive and productive knowledge in the learning process. Although both groups were

engaged in-class instructions and training, DST was implemented by the experimental group participants as a learning facilitator. After a month of the treatment, and following the administration of a pretest and post-test, it was found that both the experimental and control groups had made progress by the end of treatment. However, after implementing more statistical analysis, it could be observed that the experimental group showed significantly better results than the control group. Moreover, the receptive and productive knowledge of students in the experimental group was measured, and it was revealed that DST assisted the learners in performing better in the productive words than the receptive ones in the post-test. Given that the experimental and control groups showed improvements throughout the treatment, it may be inferred that regular practice or teaching contributes to learning. Nevertheless, the notable improvement in the experimental group highlights the enhanced benefits of DST in actively engaging students and increasing their language proficiency. This methodology presumably facilitated a heightened level of interactivity and immersion, enhancing students' ability to learn and apply new vocabulary and language structures more efficiently than the conventional methods employed with the control group. DST is likely to have increased the interest and drive of learners by offering an innovative and collaborative educational opportunity. This approach necessitates active participation, prompting students to use language in meaningful contexts. As a result, it encourages further cognitive processing and improves knowledge retention. Furthermore, DST integrates multiple media components, including visuals, sound, and video, accommodating diverse learning preferences and reinforcing linguistic concepts through multiple sensory modalities. Utilising a multimodal approach helps enhance the understanding and retention of abstract linguistic concepts by making them more tangible and easier to grasp. Furthermore, the interactive aspect of DST likely facilitated a conducive learning atmosphere, enabling students to acquire knowledge from one another, obtain prompt feedback, and enhance their linguistic skills through peer engagement. The social component of learning can enhance self-assurance and alleviate fear, resulting in more proficient language output. Ultimately, the iterative process of generating and refining digital stories facilitates ongoing practice and reinforcement of language skills. Engaging with the language repeatedly in different situations enhances receptive and productive knowledge. However, it impacts productive abilities more as students actively create and express their stories. Therefore, the improved outcomes of the experimental group can be explained by the diverse advantages of using DST in language acquisition. The experimental group's superior performance in productive vocabulary acquisition may be attributed to the inherently creative and expressive nature of DST activities. Learners were required to actively create narratives using the target vocabulary, integrating visual and audio elements, and subsequently presenting their narratives to an audience. This process engaged several modalities of output, enhancing lexical retrieval and contextual application. This method aligns with Swain's (1985) output hypothesis, which posits that language production tasks require learners to interact with language more precisely and reflectively, hence enhancing productive competence. The cyclical activities of generating, revising, and presenting offer several opportunities for active vocabulary engagement, thus enhancing form–meaning connections more effectively than just passive exposure.

The study's results are consistent with the research conducted by Nami and Asadnia (2024), which investigated pupils' attitudes toward DST-based word learning experiences and the benefits of interactive, learner-generated digital stories (DSs) for vocabulary knowledge acquisition. The main discovery of the investigation was that DST enabled pupils to personalise their vocabulary acquisition, integrate it into everyday situations, engage in peer-promoted learning, and enhance their cognitive–affective interaction.

In a similar study, Al Ghaithi et al. (2023) investigated the impact of DST on the motivation, vocabulary growth, and SDL of Omani learners. The results suggested that DST enhanced vocabulary acquisition and overall language learning, while also encouraging self-directed learning among EFL learners.

The paper's findings align with the study by Sembiring and Simajuntak (2023), which explored the potential of DST as a supplement to traditional classroom instruction to increase vocabulary. The findings demonstrated that DST helped the treatment group of pupils increase and solidify their vocabulary. Maya et al.'s (2022) study investigated how young students perceived the use of DST in vocabulary training. The findings suggest that EFL teachers should utilise effective digital narratives to educate and promote vocabulary development among younger participants.

Conclusion

This paper assessed the impact of DST on Omani EFL learners' receptive and productive vocabulary acquisition. A statistical analysis of 48 Omani undergraduate learners revealed that with DST, the experimental group outperformed the control group, which received traditional paper-based instruction.

These findings have significant ramifications for educators, educational establishments, and learners. According to the study's results, instructors should consider fusing in-person education with digital resources and platforms to create more real-world, useful, productive, and fulfilling learning environments for language learners. Digitalising courses may also help students become less reliant on instructors and paperwork. However, to implement digitisation successfully, the institution must work with all available human and nonhuman resources to create practical and helpful materials that support language acquisition. Through the DST discovery learning method, students are also encouraged to utilise technology, tools, and programs to enhance their independence in language learning and develop their computer literacy and critical thinking skills.

It is crucial to acknowledge that the paper had some limitations which may provide insights into future research in related fields. The first limitation of this study is that the findings cannot be broadly applied, as the research was conducted at a single Omani institution with students with intermediate English proficiency as the target group. To better understand the situation of DST in Oman, further studies should be conducted in various Omani institutions across the country, involving students with both higher and lower levels of English proficiency. The next limitation was that the study focused on the students' receptive and productive vocabulary knowledge; further studies are suggested to cover other skills and subskills, such as vocabulary depth and breadth, grammar, and reading, in the learning process. Another limitation of this study was that it did not focus on the perceptions and attitudes of learners and teachers to understand the human and nonhuman strengths and weaknesses of the learning process using DST. Therefore, it seems essential to conduct further studies to find out the perceptions of both teachers and learners regarding the implementation of DST. As the final limitation, since institutions benefit from the results, this study did not attempt to interview managers to determine if there is sufficient equipment for all students and teachers to be engaged in DST or if universities are willing to provide enough equipment for digitalising the learning process. Thus, more studies could focus on managers' decisions and technical concerns regarding DST in the learning process.

In addition to addressing current limitations, further research can explore innovative approaches to improve the understanding of DST in language learning. Future studies may investigate the integration of DST with artificial intelligence tools, such as automated feedback

systems or speech recognition apps, to enhance language input and output. Researchers can also investigate how DST helps students study independently, use metacognitive methods, or become independent learners in various educational settings. Another interesting area to explore is the collaborative aspect of DST, examining group storytelling projects and their impact on social interaction, peer review, and the process of creating meaning. Additionally, comparative studies may investigate the effectiveness of DST in face-to-face, hybrid, and fully online learning environments. The impact of emotional factors such as anxiety reduction, motivation, and engagement requires more systematic investigation in relation to DST activities. Ultimately, cross-cultural research examining the implementation and reception of DST in various educational systems may provide valuable insights into contextual adaptability and pedagogical design across diverse learner populations.

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