| **RESEARCH ARTICLE**

Digital Storytelling in EFL Education: Learning Outcomes and Methodologies

Xiaoxin MIAO[1] and Lingling LI[2] ✉

[1]School of Asian Languages and Cultures, Zhejiang International Studies University, Hangzhou, Zhejiang Province 310012, China.
[2]School of Applied Foreign Languages, Zhejiang International Studies University, Hangzhou, Zhejiang Province 310012, China.
Corresponding Author: Lingling Li, **E-mail**: linglingli@zisu.edu.cn.

| **ABSTRACT**

We reviewed a series of studies using digital storytelling (DST) in the teaching of English as a foreign language (EFL), aiming to identify DST's recurrent effects on EFL learning and to summarize the common methodologies adopted in this area, thereby providing potential directions for further investigation. After a close analysis, three main learning outcomes of DST emerged, which were closely associated with the enhancement of EFL learners' language proficiency (speaking, writing, literacy, etc.), improvement of student engagement and motivation, facilitation of creativity, autonomy, etc. The methodologies employed varied in studies, including quantitative, qualitative, or mixed methods. By synthesizing the literature, we pointed out several challenges and limitations and identified underexplored areas for further study.

1. Introduction

Digital storytelling (DST) represents a new form of narration in the information age. Presenting a mix of images, audio, music, animation, text, and narration in short minutes (Lambert, 2010, 2013), it could be used to achieve various goals, e.g., telling stories, reviewing events, discussing specific themes and expressing viewpoints, etc., and has been applied in various fields such as art, journalism, and psychotherapy. In the area of education, DST has garnered continuous interest and growing adoption at primary, secondary, and higher education levels worldwide (Lucarevschi, 2016; Wu & Chen, 2020). Several systematic reviews have examined the role and effects of DST in language learning, focusing on children (Ong & Aryadoust, 2023), adolescents, and adults (Lim, Zakaria, & Aryadoust, 2021), particularly in the development of speaking skills (Nair & Md Yunus, 2021). However, apart from linguistic competencies, other types of outcomes could arise from educational DST, including affective, cognitive, conceptual, academic, technological, ontological, and social aspects (Wu & Chen,2020). To our best knowledge, these additional outcomes have not yet been fully reviewed, leaving us less informed about the broader impacts of DST in EFL education. As such, the primary purpose of our literature review is to provide a comprehensive insight into the study of DST in EFL teaching and learning, especially revolving around students' learning outcomes and research methodologies, in order to identify possible research directions in the future.

Specifically, we would like to address two questions of interest: 1) What recurrent learning outcomes emerge from the studies reviewed? 2) What methodologies were employed by the researchers? To answer these questions, we adopted the literature review methodology used by Wu & Chen (2020) but narrowed the scope down to those only related to EFL teaching and learning. In the subsequent sections, we will first present our findings from relevant studies and then provide possible recommendations for future research.

2. Effects of DST on the Learning of EFL Learners
After we systematically reviewed and coded the collected studies, several recurrent learning outcomes of DST-based instruction emerged, mainly including the enhancement of EFL learners' language skills, improvement of student engagement and motivation, and the fostering of other competencies such as creativity, digital literacy, critical thinking, and autonomy, etc.

2.1 The Effect of DST on Enhancing EFL Learners' Language Skills
The enhancement of language skills (e.g., speaking and literacy) through DST-based instruction has been a focal point of the research reviewed. Many studies emphasized the significant role of DST in improving learners' oral proficiency. They took DST as an interactive approach to improve EFL learners' oral production and performance. Our findings were consistent with the study of Nair and Yunus (2021). Their systematic review of 45 articles from Google Scholar and ERIC indicated that DST is an effective tool for educators at all educational levels, from primary to tertiary education, in improving students' speaking skills.

The methodologies involved include 1) quantitative (Tahriri, Tous & MovahedFar, 2015) and quasi-experimental designs (Yang, Chen & Hung, 2020), such as scores of pre-tests and post-tests, questionnaires, and 2) qualitative methods, such as case studies, observations, and interviews (Smeda, Dakich & Sharda, 2014). 3) Mixed methods were also used to contrast the effects of DST-based instruction with traditional storytelling on speaking skills (Abdolmanafi-Rokni & Qarajeh, 2014).

The positive impact of DST on improving EFL learners' language proficiency has been typically examined through comparative studies. One prevalent method involves a between-group experimental design, where researchers compare student performance results from the implementation of different teaching approaches, i.e., the DST-based approach vs. the conventional teaching method. For example, Yang, Chen & Hung (2020) contrasted students' English-speaking proficiency in DST instruction with that of a more conventional PPP (presentation-practice-production)-based model. Their findings indicated that DST was particularly effective in enhancing EFL learners' oral English skills.

Moreover, Tahriri, Tous & MovahedFar (2015) examined pre-intermediate level student's listening, speaking, and motivation in DST vs. conventional instructions and concluded that DST instruction had a positive impact on EFL learners' oral skills as well as motivation. In addition, Razmi, Pouralib, and Nozad (2014) used an experimental design to assess the oral performance of two groups of Iranian undergraduate EFL learners. One group created and presented DST in the classroom, while the other group only read and presented stories in a conventional way. They tested student's oral performance in terms of vocabulary, grammar, fluency, and pronunciation and the results demonstrated that DST significantly enhanced students' oral skills.

The other way is employing a within-group design to compare EFL learners' language change before and after conducting DST in the classroom. For example, Fu, Yang, and Yeh (2021) used the Toontastic application and evaluated the fluency and language use of EFL learners. They measured students' speaking competence by using pre- and post-tests. The findings were in line with previous studies, i.e., DST effectively advanced learners' speaking. Moreover, Alcalde-Peñalver & Santamaría-Urbieta (2021) examined students' perceptions of DST-based Business English learning in a survey and found similar results, i.e., DST was effective in developing EFL learners' language skills and new literacies. In another study, James, Yong, and Hong (2019) focused on the effect of creating Scribe videos on improving primary students' oral skills. They compared student's oral assessment scores in the pretest and posttest and confirmed an enhancement in students' speaking skills.

Although the body of research was reviewed, adopting various methodologies indicates that DST effectively enhanced EFL learners' language skills, and the reliability of those studies has not been examined. For the between-group design, challenges include how to ensure the testable conditions are comparable; otherwise, the results might be biased. On the other hand, the types of DST (audios, videos, PowerPoints, etc.) and the duration of intervention implemented were inconsistent, thus making it difficult to confirm and generalize the findings across different contexts.

2.2 The Effect of DST on Increasing Student Engagement and Motivation
DST's contribution to EFL learners' engagement and motivation is the second emerging effect we found in the literature. The studies reviewed highlighted the creativity and expressiveness of DST in motivating students and enhancing their language learning experiences, advocating for its broader adoption in EFL contexts to stimulate learner engagement. For example, Liu, Tai, & Liu (2018) revealed that DST positively enhances ELF learners' extrinsic rather than intrinsic goal orientation and elaboration, as learning became more fun, enjoyable, and appealing when intergrading with DST, which increased students' attention in the classroom (Ahmad & Yamat, 2020). Moreover, the interaction between students and DST techniques further encourages student participation, leading to enhanced learning outcomes.

While DST-based learning improves student engagement, it also enhances language competence, including vocabulary, writing, and speaking skills (Hava,2019; Adara & Haqiyyah, 2020). For example, Nassim (2018) found that DST not only significantly boosted engagement among students in an English foundation course at the Arab Open University but also improved their reading, writing, and creative skills. More directly, Fu, Yang & Yeh (2021) found a positive correlation between learners' engagement and speaking competence. Specifically, they showed how the use of DST could facilitate four types of learning engagement in their students, i.e., intellectual, emotional, behavioral, and social, alongside the upgrading of students' fluency in expressing their thoughts in English.

In terms of methodologies adopted, regarding what was presented in the previous section, most of the reviewed studies employed one or a combination of quantitative, qualitative, and mixed methods. For example, Ahmad and Yamat (2020) conducted a survey on fourth-grade students' perceptions of DST in Kuala Lumpur. The results revealed that students favored digital storytelling over traditional methods. The preference was attributed to greater interest and engagement, more classroom focus, and better story comprehension fostered by the DST-based instruction. Similar findings are supported by the research conducted by Smeda, Dakich, and Sharda (2012, 2014). Utilized qualitative methods such as case studies, observations, and interviews, they observed a significant boost in student participation and interest in DST learning activities, suggesting that the interactive and multimedia-rich nature of DST makes the learning process more appealing and accessible to students.

Expanding on this, Tahriri, Tous, and MovahedFar (2015) utilized a between-group experimental design to investigate the effects of DST on intermediate EFL learners' listening and speaking skills, as well as their motivation. The results from pre-tests, post-tests, and a motivation questionnaire revealed that the DST group exhibited significant improvements in both speaking skills and motivation compared to the control group. In another experimental study, Liu, Tai, and Liu (2018) examined the implementation of a free-space DST on motivation changes with sixth grade EFL students. Results analyzed from motivation surveys, achievement test scores, and digital stories indicated that DST positively influenced students' external goal orientation and speaking competence.

Moreover, Yoon (2013) used a mixed-method and explored the effects of DST on Korean primary ELL learners' attitudes and perceptions. Data were collected from self-evaluation reports, lecture reviews, and pre-/post-surveys on learning attitude and reading comprehension. Their findings indicate that digital storytelling positively influenced students' attitudes, enhancing understanding, engagement, motivation, and confidence in learning English.

Adara and Haqiyyah (2020) carried out a quasi-experimental study with university students in Indonesia. Data were analyzed from two sets of questionnaires, semi-structured interviews with two students, and English test scores collected before and after the treatment. They found that students in the DST-based instruction demonstrated higher motivation and better performance in English tests than those in the control group.

The collective findings from these studies underscore the role of DST in increasing student engagement and motivation in EFL learning across various educational levels and cultural contexts. The interactive nature of DST, along with multimedia elements, makes the learning process more enjoyable and interactive, fostering active participation among students. Moreover, the various research methods used in these studies, whether qualitative, qualitative, or mixed methods, provided multifaced data to reveal how DST affects EFL learners' motivation and learning engagement.

2.3 The Effect of DST on Fostering EFL Learners' Creativity and Other Competencies
Other recurrent effects of DST-based instruction on learning outcomes include its enhancement of EFL learners' creativity, critical thinking abilities, autonomy, digital literacies, etc. As will be presented below, although the effect of DST on learners' creativity has been more frequently highlighted, the outcomes besides that have not been extensively researched.

Alcalde-Peñalver and Santamaría Urbieta (2021) studied the application of DST-based instruction in Business English and analyzed data from both quantitative (a survey) as well as qualitative (students' answers) sources. The findings revealed that DST activities not only improved language skills but also promoted critical thinking, creativity, and other competencies that are essential for the 21st century (also see Liu, Tai & Liu, 2018).

Additionally, Yang, Chen & Hung (2020) adopted a quasi-experimental design to compare the learning outcomes of two groups of seventh-grade students. One was taught under DST-based instruction, and the other was PPP-based instruction. They collected scores from an English test and from pre- and post-tests of creative thinking. The results revealed that DST-based teaching facilitated EFL learners' speaking proficiency and creative thinking abilities, which could contribute to the authentic and meaningful learning process of DST projects.

Anderson, Chung & Macleroy (2018) integrated language learning with digital technology through a multilingual DST project, which was implemented with students from diverse linguistic backgrounds, employing a critical ethnographic method and multimodal analysis. The main types of data collected from the project include video recordings and photographs, interviews, video/audio recordings of meetings and workshops, documents, draft and final versions of digital stories, etc. The results revealed that MDST promoted both creative thinking and digital literacy among language learners.

Besides the development of creativity, other outcomes of DST, such as learners' autonomous learning and identity construction, were also investigated. For example, Kim (2014) focused on learners' autonomy and speaking improvement in DST, using both qualitative (three questionnaires) and quantitative (four assessments) instruments such as digital self-study resources, online recording programs, and speech-text-program (STP). The results indicated that learners developed autonomous learning and built considerable self-confidence. Furthermore, Liu, Huang, and Xu (2018) examined six-grade learners' autonomy and emotional experiences via group vs. individual work. Results from various instruments, including knowledge tests, language learner autonomy questionnaire, foreign language classroom anxiety scale, and FaceReader facial expression software, revealed that students working cooperatively demonstrated better learning outcomes regarding the knowledge test and autonomous learning scores. Moreover, it was found that group-work students developed greater learner autonomy, less classroom anxiety, and more positive emotional experiences, highlighting the importance of integrating collaborative working in EFL DST-based instruction. In another study, adopting various qualitative methods such as interviews, classroom observations, and analysis of DST products, Kim and Li (2021) found that DST had multiple influences on students. In theirs, students integrated text, images, sound, animations, emojis, and other resources through the DST-based capstone project to present their viewpoints and messages, thereby developing their identities and learning.

The aforementioned studies underscore the broader educational benefits of digital storytelling in EFL teaching and learning, extending beyond improving language skills to encompass the development of essential modern skills. These findings highlight DST's potential to foster critical and creative thinking, as well as other competencies in language learners, adding unique dimensions to the understanding of DST as an innovative approach to foreign language teaching and learning.

3. Limitations and Implications for Future Research

Although most of the findings of our review indicate that DST-based instruction has a positive effect on EFL learning outcomes, such as it could improve learners' language proficiency, engagement, motivation, autonomy, and creativity, among other benefits, it should also be noted that DST may have no effect on improving learner competencies. For example, Yilmaz et al. (2020) reported DST could not develop students' learning strategies. Moreover, Fu, Yang & Yeh (2021) found no correlations between learner engagement and language fluency, nor between engagement and language use, indicating the complexity of exploring the impact of implementing DST in EFL teaching and learning. Based on the findings mentioned above, we identified potential areas that have not been fully examined for further research.

First, more than half of the current studies have revolved around learning outcomes and learner performance at the individual level, with less attention paid to collaborative DST learning. To date, the literature reveals limited insights into the differential learning effects that group-based DST could enhance. However, according to Tahriri, Tous & MovahedFar's (2015) study, language learning is fundamentally social, and group DST work could potentially foster communication skills, peer learning, and the negotiation of meaning. Moreover, extra skills developed through DST, such as digital literacy, meaning negotiation, self-efficacy, and intercultural communication were remain under explored. In order to determine the efficacy of these various learning outcomes of DST, future research should expand the scope in these aspects, i.e., examining extra competencies as well as DST learning at the group level.

Second, there is a critical need to validate and confirm the results of studies involving participants from various educational levels, cultural backgrounds, or geographic regions. As such, it is essential to develop rigorous research instruments that have high validity and reliability, especially developing questionnaires that are tailored to the specific research purpose of DST-based instruction and learning. Otherwise, the lack of validity and reliability of measurement instruments used in data collection may compromise the accuracy of findings (Fu, Yang, & Yeh, 2021; Lim, Zakaria, & Aryadoust, 2021). Additionally, in order to have deep insights into the long-term effects and challenges of DST-based learning, the method of longitudinal studies could be used, providing us with a better understanding of its practical applications.

Third, although the benefits are presented, current studies lack investigations of the challenges facing EFL teachers and learners. As digital tools and platforms evolve, educators and students encounter challenges with the adoption of newly developed technologies (e.g., virtual reality and artificial intelligence technology) and often lack the necessary training to implement DST

effectively (James, Yong, & Yunus, 2019). Therefore, further research is suggested to include teachers' voices, including their reactions, viewpoints, and feedback to incorporate DST in classroom teaching.

4. Conclusion
Overall, the review of existing literature revealed some recurring benefits of using DST in EFL classrooms, including that DST enhances learners' language skills, engagement, motivation, creativity, autonomy, etc., showcasing its substantial potential as a tool for improving foreign language education.

Moreover, we identified various methodologies adopted in those studies. Specifically, quantitative methods included English proficiency tests prior to or after the DST intervention, questionnaires, scores of DST products, etc. Qualitative methods involved interviews, content analysis, observations, case studies, etc. Some studies used both quantitative and qualitative methods to support their findings.

Despite positive findings, we suggested areas of research that require further study, which include but are not limited to broadening the research scope regarding DST learning effects, incorporating investigations of collaborative DST learning among students, ensuring the validity and reliability of the instruments and results, conducting longitudinal research, and incorporating teacher perspectives on using DST to teach EFL.

Although we included as many studies as possible, some new publications may still be missing. We hope future reviews will add new findings to our research and provide a more comprehensive understanding of DST-based instruction and learning.

Conflicts of Interest: The authors declare no conflict of interest.

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