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RETRACTED: Multimedia Presentations Through Digital Storytelling for Sustainable Development of EFL Learners' Argumentative Writing Skills, Self-Directed Learning Skills and Learner Autonomy

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The present study explored the impact of online digital storytelling on developing EAP students' argumentative writing skills, and its impact on improving self-directed learning skills and learner autonomy in language learning. To reach such ends, a standardized pretest and posttest in argumentative writing skills were designed, which depends on the writing tasks of IELTS task 2 and Independent TOEFL test writing tasks. Also, the self-rating scale of self-directed learning and language Learner Autonomy Scale (LAS) have been exploited. The two experimental groups were trained to write using two different types of learning; group A through online storytelling and group B used offline content producing software to produce digital storytelling to promote writing skills. On the other hand, the control group (group C) used a traditional storytelling strategy. Results primarily revealed that the literacy skills of those who produced their stories with the offline software (group B) improved significantly in comparison to the other experimental group which was taught through online digital storytelling (group A). The control group achieved the least of the three groups in developing target skills. Further, the qualitative analysis of experimental group members' responses in the semi-structured interviews revealed positive attitudes toward learning through blended learning approaches compared with pure online web-based learning. It is, therefore, recommended that blended learning should be used for students from communities with poor digital literacy and technology infrastructure. Also, online learning should be used with care to cope with community needs to fill a real gap in field practices in language learning to improve multiliteracy skills.

Keywords: multimedia presentations, on-line digital storytelling, off-line digital storytelling, sustainable development, argumentative writing, self-directed learning, learner autonomy

INTRODUCTION

In the language learning arena, the storytelling strategy proved to be effective, since it helps in the development of learners' language abilities, particularly listening skills (Colon-Vila, 1997; Ellis, 1997). It allows language learners to listen quietly and actively. Through the development of story schema, storytelling also helps learners to improve skills in both oral and written communication. Kim (1999) claims that storytelling is becoming more widely acknowledged for its theoretical and practical implications. It provides a conceptual framework for thinking that allows students to integrate their experiences into a whole, mentally map their experiences, and visualize images in their thoughts (Collins, 1999).

Storytellers having difficulty reaching a large audience use the digital medium to gain popularity and impact. As a result, digital media provides us with new and exciting ways to capture and share our stories with others. It denotes the art of creating compelling narrative films using digital content such as still images, video clips, voiceovers, sound effects, and music (Roland, 2007). As a type of multimedia, digital storytelling (also known as DST) consists of images and video segments with background music and a voice-over narrative (Hull and Nelson, 2005).

With the advent of technology, the possibility for digital storytelling to replace traditional storytelling has grown, primarily for entertainment and preaching purposes. DST is an extension of conventional storytelling that involves the digital investment of human narratives to communicate meanings and feelings to an audience with the immediacy and multimodality offered by modern multimedia (Robin, 2008). It is an extension of old-fashioned storytelling, relying on the power of stories to transmit wisdom and knowledge through the fruits of modernity and technology (Kuan et al., 2012).

DST is a widely recognized pedagogical strategy for its engaging, participatory, and immersive qualities (Weis et al., 2002; Marcuss, 2003; Farmer, 2004; Hull and Zacher, 2004; Kajder and Swenson, 2004; Hull and Nelson, 2005; Salpeter, 2005; Davis, 2006; McLellan, 2006; Ohler, 2006). It is a creative medium that can be used to integrate subject matter, knowledge, and skills from various areas of the curriculum (Davis and Waggett, 2006). Before focusing on technology skills and the development of high-quality media products, a DST strategy focuses on cooperative work and culminates in experiences resulting from individuals sharing stories. As a result, using a DST strategy facilitates and strengthens additional community connections through a process of listening to and reflecting on the stories provided.

DST has been used in the classroom for a variety of purposes, including teaching content, empowering students by making them active researchers and storytellers, teaching writing, and building communities through storytelling (Banaszewski, 2002; Salpeter, 2005; Dogan and Robin, 2008). In the long run, using DST helps learners engage in their jobs since they are learning on their own. Within a contextual environment, it provides learners with real-world relevance and personal worth (Bruner, 1996; Kearney and Schuck, 2005; Lathem, 2005; Lambert, 2006). It allows learners to combine instructional messages with learning activities to make learning more engaging and entertaining. Also, it allows students to get meaningful learning experiences in a constructivist learning environment (Smeda et al., 2014). DST can create virtual learning environments when it is used for learning twenty-first century skills and competencies needed in students' future working life (Niemi et al., 2014).

In a related context, argumentation theory, also known as argumentation, is the interdisciplinary study of how to reach conclusions from premises using logical reasoning. It encompasses civil debate, dialogue, conversation, and persuasion as arts and sciences. It investigates inference rules, logic rules, and procedural rules in both artificial and real-world settings (Grootendorst, 2004). Argumentation encompasses deliberation and negotiation, both of which deal with collaborative decision-making procedures. This art and science are frequently used by people to defend their beliefs or self-interests—or to choose to change them—in rational dialogue, common parlance, and during the arguing process (Jory, 2016). Argumentation, along with exposition, description, and narration, is one of four rhetorical modes (also known as modes of discourse). The argumentative impulse arises from the anticipation of a genuine or imagined difference of opinion on a controversial issue (van Eemeren et al., 2014). Current theories of argumentative writing (Ferretti and Fan, 2016) acknowledge its intrinsically social and dialogical nature, as well as the presentation of a constellation of propositions aimed at achieving the interlocutors' discursive goals (van Eemeren, 2018).

In addition to its positive effects on developing argumentative writing skills, digital storytelling strategy cab help also in developing self-directed learning skills. Self-direction, according to Mocker and Spear (1982), is a dimension of lifelong learning that can be facilitated through formal and informal learning. Self-directed learning prepares individuals for lifelong learning, it must be considered in the context of the understanding of lifelong learning (Brockett and Hiemstra, 1991; Spencer and Jordan, 1999). Additionally, DST is a synthesis of storytelling art, multimodal design, and digital literacy (Starcic et al., 2016). By organizing self-access learning resources through technology, a DST task encourages learners to develop their understanding of newly acquired knowledge (Kim, 2014). These activities effectively assist students in achieving greater learning autonomy (Liu et al., 2018).

LITERATURE REVIEW

Digital Storytelling: New Teaching Strategy in the Pandemic

For educational objectives, DST is employed as an embodiment of multimedia production. As a result, it is becoming a part of our lives and is on the verge of becoming a significant aspect of teaching and learning. All of this is made possible by easy access to technology, such as digital cameras and scanners, as well as user-friendly software. For the past few years, many educational institutions have been investigating the use of DST (Robin, 2008).

In the late 1980s, the Center for Digital Storytelling in California developed DST as a tool for community theater workers to record, produce, and distribute stories (Lambert, 2009). According to Normann (2011), digital

storytelling is "a short story, about 2–3 min long, in which the storyteller utilizes his voice to tell his own story. The personal element is emphasized, and it can be linked to other people, a place, an interest, or anything else that would add a personal touch to the story" (p. 12). This has evolved in a variety of ways, influenced by developments in personal computing and recording technologies, as well as its application in a variety of academic and non-academic situations (Normann, 2011; Clarke and Adam, 2012).

The Significance of Digital Storytelling

The student-centered approach to teaching and learning is exemplified by the DST strategy, which prioritizes the role of students over that of teachers. Teachers serve as a guide, facilitator, and monitor during the digital storytelling sessions. Learners can also benefit from the DST technique because they can study at home with these digitalized materials. As a result, due to its democratic potential, DST projects are frequently used in educational settings (Couldry, 2008). Students' personal information combined with technology can be utilized to tap into students' interests and abilities (Staley, 2017). Students are allowed to play a vital role in their learning when personal anecdotes are combined with technological advancements.

Besides, DST can help teachers and students use a constructivist strategy for teaching and learning. It allows for the integration of digital material with novel teaching and learning methods. DST fosters additional educational outcomes in conjunction with honing learners' technology abilities. It helps teachers create constructivist learning environments that stimulate creative problem solving through collaboration and peer-to-peer communication by increasing learners' motivation. DST can also be utilized to support integrated curriculum development and engage learners in higher-order thinking and deep learning (Dakich, 2008).

Also, DST allows students to engage in active learning processes by building on earlier experiences and assisting them in the formulation of compelling social relationships. According to Prince (2004), the fundamental parts of active learning include student action and participation in the learning process, which cannot occur in a typical classroom where students can only absorb information and knowledge from professors. DST provides an interactive learning strategy that increases student participation, resulting in active learning (van Gils, 2005).

In addition, DST enhances learning engagement, it can help engaging and drive pupils to learn difficult concepts. When combined with improved retention rates and learning efficacy, DST can teach complicated concepts in a more effective and lasting manner (Dupain and Maguire, 2005). It can improve learning strategies such as student engagement, reflection for deep learning, project-based learning system, and technology integration, such as using multimedia technology skills in the classroom; students will be more engaged and enthusiastic in the classroom with DST (Xu et al., 2011). According to Lambert and Hessler (2018), employing various tools to create digital stories using sophisticated technology not only increases student engagement but also helps students acquire technical and communication abilities.

Digital storytelling was also used to help students centralize their learning and explain and position themselves in their lives and education (Clarke and Miles, 2003; Kuh, 2003; Hargreaves, 2005; Robin and Pierson, 2005; Williams et al., 2006; Lee, 2007; Ohler, 2008, 2010; The International Center for Leadership in Education, 2009; Guffey, 2012; Lamb, 2017). According to Nieto (1994), "listening to students' views about school policies and practices can help change them" (p. 396). Digital storytelling was used to explore adolescent schooling reflections. The stories collected and shared in this article help "know" diverse youth perspectives (Panelli, 2002). Assuming that youth are creators and innovators (Morrell, 2008; Kinloch, 2012), their digital stories and contributions provide valuable insight into contemporary educational issues.

Digital Storytelling for Developing Argumentative Writing

The capacity to make a good argument in both verbal and written situations, according to Lam et al. (2017), is essential in today's culture. Argumentation is a cognitive talent that is critical for idea generation, issue resolution, and sound judgment. Despite the critical necessity of argumentative writing skills for language learners, little empirical research has expressly focused on teaching students to create argumentative material (Nussbaum and Schraw, 2007; Lukomskaya, 2015).

There should be two main sides to have good arguments: claims and counterclaims (Nussbaum and Schraw, 2007). Because the writer appears to be more informed and less biased, the integration of claims and counterclaims is clearer and more convincing in written texts than in spoken dialog (O'Keefe, 1999). As a result, writers must express certain statements about a topic, challenge those claims, provide supporting details with reasons, examine the reasons, rebut them, and finally reach a conclusion (Kuhn, 1991). Toulmin et al. (1990) established a well-known model of argumentative writing, which incorporates evidence, claim, warrant, backing, and rebuttal.

Argumentative essay writing needs solid argumentation and reasoning strategies (Wingate, 2012). It is a dynamic literacy practice in which the author establishes a dialogic relationship with an audience to convince, gain adhesion, or persuade them of a point of view (Álvarez, 2001). Argumentative essay writing is regarded as an important educational goal and a popular activity among higher education students (Noroozi et al., 2016; Wu, 2016; Asterhan, 2018), particularly when dealing with complex and contentious issues. Argumentation has always been regarded as an essential component of all essays (Wingate, 2012). Argumentative writing skills necessitate reasoning and higher-order thinking skills like predicting, analyzing, and synthesizing. Such abilities are difficult for any FL student, let alone for writing in one's first language. Argumentative writing discourse is critical for foreign language students to articulate their ideas in academically appropriate patterns and approaches.

Learners in social constructivist learning paradigms engage in discussions with their peers, argue and negotiate meaning with them to learn about the topic, (co) construct knowledge, and/or solve complex problems (Noroozi et al., 2012). It

aids in the acquisition of knowledge, the development of scientific thinking skills, and the improvement of comprehension (Golpour, 2014). Furthermore, argumentative writing can boost intrinsic motivation and improve problem-solving skills in academic settings (De La Paz, 2005; Chinn, 2006; Sampson and Gleim, 2009).

Many learning assignments, from elementary school to university and beyond, require argumentation. Computer-assisted argument scaffolds can help learners in a group engage in argumentative discourse while also engaging in interactive discussions (Noroozi et al., 2018). DST is a dynamic mixture of tales and technology (Rossiter and Garcia, 2010), it is effectively used in writing classes to increase students' academic performance and writing skills. Researchers have recorded strengthening writing skills through multimedia and modalities (Vasudevan, 2010). Gakhar and Thompson (2007) claimed that DST has significantly increased students' writing abilities, critical thinking abilities, and media literacy. Dogan and Robin (2008) also showed that students in classrooms where teachers used DST demonstrated technical, presentational, research and organizational, and writing skills. When instructors used DST, struggling writers found themselves straying.

DST strategy with multimedia was beneficial in boosting feature writing especially argumentative writing skills. It was also that DST digital storytelling improves students' creativity and critical thinking (Tang, 2016). In a comparable context, Sepp and Bandi-Rao (2015) observed that employing DST is beneficial in improving the ESL writing skills of urban community college students. A previous study conducted by the same two researchers, Bandi-Rao and Sepp (2014), found that employing digital narrative assignments for learning basic writing abilities while using the TPCK framework had a good impact.

Digital Storytelling and Self-Directed Learning Skills

The definitions of metacognition, self-regulation and self-directed learning are all ambiguous in the literature (Alexander, 2008; Kaplan, 2008; Loyens et al., 2008). There are no clear-cut lines between these three notions; two of them are connected but separate from one another, namely meta-cognition and self-regulated learning; both concepts should be regarded as subtypes of a more general capacity of self-regulated action (Kaplan, 2008). Self-directed learning, on the other hand, is a broader notion that incorporates self-regulated learning in the context of problem-based learning (Loyens et al., 2008).

Self-regulated learners take ownership of their learning needs by accepting or refusing assistance from others, whether teachers or peers, expressing their learning objectives, identifying human and material resources for learning, selecting, and implementing appropriate learning strategies, and taking initiatives to assess learning outcomes. Self-regulated learning is a process that involves both cognitive and behavioral learning; it is a cognitive process that allows learners to view their surroundings and the world through a different lens as they work toward changing their perspectives based on action thinking (Knowles, 1975; Brookfield, 1986).

Students who have self-directed learning skills are conscious of their duties in learning; they operate autonomously without the assistance of others, are curious, eager, and self-confident, successfully arrange their time, and plan to accomplish their tasks (Hall, 2011). In this context, self-directed learning is synonymous with DST because it includes setting learning objectives for creating and implementing DST. Students take an active role in contributing their own opinions or points of view, picking the best background music, and adding their unique touch by recording their voices. Self-directed learning strategies, like DST, involves changing the roles of both teachers and learners. In self-directed learning, students must acquire knowledge and skills to identify learning needs, evaluate these needs, reflect on their learning experiences, and manage information accurately and critically (Patterson et al., 2002; Acar et al., 2015).

Digital Storytelling and Learner Autonomy

In recent years, there has been a larger emphasis on learner autonomy. Learner autonomy is an important issue for many philosophers, with connections to humanism, constructivism, and experiential learning. In humanism, learner autonomy refers to the process of placing high respect and value on the learner, viewing learning as a means of self-realization, making learners responsible for their learning, participating in decision-making processes, and teachers serving as facilitators in the learning process. As a result, Wang and Dovidio (2011) contend that constructivist teaching and learning encourage student autonomy. In experiential learning, the student is the cornerstone of the learning evidence; thus, learning occurs as a result of acting roles that learners perform (Orakci and Gelisli, 2017).

According to Ming-Chi and Yueh-Min (2017), learner autonomy requires learners to take more active roles in their learning, to be accountable for accomplishing their goals, and to work constructively and productively with others. Even though they operate in a team or a group, they are still self-directed in their learning. Autonomous learners, according to Dam (1990), are active participants in the social processes of learning and active interpreters of incoming information in terms of what is already and uniquely known. Learner autonomy has long been regarded as one of the ultimate aims of education in general, and language learning (Bajrami, 2015).

Taking all the aforementioned factors into account, this study focuses on the use of digital storytelling as a strategy for improving learners' argumentative writing skills (Stephens, 2011; Abdel-Hack and Helwa, 2014; Zakaria and Abdul Aziz, 2019) and enhancing students' self-directed learning skills (Hava, 2019), and learner autonomy (Liu and Huang, 2017). Because of the features mentioned above, Storybird was chosen for the digital storytelling activities. This popular tool for promoting argumentative writing skills and soft skills has several advantages, including a good user experience, adaptability to language level and skills, diversity of content, social interaction, user safety, and data security (Yunus and Wan Ishak, 2018).

Nonetheless, many teachers in our country still do not use or are unaware of the digital storytelling strategy's use and benefits.

As a result, this study contributes to shedding light on the use of digital storytelling through Storybird and the possibilities it provides for teaching and learning argumentative writing skills, self-directed learning skills, and learner autonomy in the Middle East and especially in Egypt. As a result, the following research questions are addressed in this study: What effect does digital storytelling have on improving argumentative writing skills, self-directed learning skills, and learner autonomy of pre-service EFL teachers? What are the pre-service EFL teachers' thoughts on using digital storytelling to improve these skills?

THE PRESENT STUDY

For students, the challenge of persuasive/argumentative writing is not a new issue. Persuasive or argumentative writing is based on the notion that a writer must persuade a specific reader, whether actual or fictional, by presenting pertinent points with supporting evidence. The primary goal is to argue a position or persuade a reader to accept a specific point of view (Harland, 2003, p. 4). Many researchers have recognized argumentative writing as the most challenging writing genre because of its character (Saito, 2010, p. 3). EFL students are expected to struggle more with argumentative writing than their L1 colleagues (El-Henawy et al., 2012). Therefore, language learners, especially prospective teachers of English, lack argumentative writing skills (Rahmatunisa, 2014; Zhang, 2018; Lee, 2020; Qin and Liu, 2021; Sundari and Febriyanti, 2021; Yang, 2022).

Also, writing argumentative essays necessitates the learner's engagement and coordination of various cognitive processes, including retrieving a schema and encoding information from sources (Wolfe et al., 2009, p. 184). According to Mickwitz and Suojala (2020), learner autonomy, self-regulation skills, and self-efficacy beliefs showed to be effective in developing academic writing skills. Also, leveraging technology helps develop argumentative writing skills, therefore, DST can be used with ease as it proved to be effective in improving writing skills in English (Nurrahmah, 2018; Sharma, 2018; Zakaria and Abdul Aziz, 2019). Positive impacts of digital storytelling have been found on enhancing self-regulated learning skills (Nietfeld, 2018; Kaya, 2019). It is also evident that digital storytelling is effective in increasing learners' motivation, engagement, and ultimately autonomy (Alterio, 2002; Barrett, 2006; Sylvester and Greenidge, 2009).

Additionally, the widespread COVID-19 pandemic, as declared by the World Health Organization (WHO) on March 11, 2020, has since become one of humanity's greatest contemporary challenges (Almenaye et al., 2021). What exaggerates the problem is that there are no effective means for combatting the disease. It will take months, if not years, to develop and provide safe and efficient clinical testing (Zhang and Zhong, 2020). COVID-19's global proliferation has resulted in months-long closures of educational and non-essential economic activity around the world (Soraci et al., 2020).

In the present study, the impact of using online platforms and offline software for designing DST and applications for pre-service EFL teachers to produce digital stories, to endeavor to develop argumentative writing skills, self-directed learning skills, and learner autonomy. These two experimental groups are compared with another control group, which was deprived of both online web-based learning platforms and computer-mediated software and applications, they have only to use a traditional storytelling strategy. Students in the two experimental groups were expected to produce and use digital stories through both online and offline tools. Whereas the control group used none of the facilities, they were taught through a traditional storytelling strategy. They were asked to perform an argumentative writing task for the researcher to assess EAP students' argumentative writing skills like task 2 of IELTS and the Independent writing task of the TOEFL test. Argumentative writing skills are crucial for university students in general, especially EFL pre-service teachers. According to Duschl et al. (2007), argumentation has the potential to shift the focus of science classrooms away from rote memorization and toward engaging students in a complex scientific practice in which they construct and justify knowledge claims (Berland and McNeill, 2009; Aydeniz and Dogan, 2016).

In addition, self-directed learning skills and learner autonomy are two necessary skills that EFL pre-service teachers (Öztürk, 2019), Learner autonomy has grown in importance and priority in language classrooms since the introduction of the communicative approach (de Oliveira e Paiva and Braga, 2008). The emergence of learner autonomy has resulted in a shift away from teacher-centered classrooms and toward learner-centered classrooms (Dam, 1995), and several definitions of learner autonomy can be found in the literature.

Online DST is supposed to yield great gains based on a multiliteracies perspective, on the other hand, traditional teaching strategy through telling stories may not help students to reach similar degrees of digital literacy. Students have positive attitudes toward blended learning as an effective tool for digital storytelling production and implementation (Nassim, 2018). It includes systematic guidance, monitoring, scaffolding, and providing immediate feedback to learners side by side with formative assessment tools. In sum, the current study validates the following hypotheses:

1. There are statistically significant differences between the two experimental groups (A and B) groups and the control group (C) in their performance in argumentative writing tasks
2. There are statistically significant differences between the experimental groups (A and B) groups and the control group (C) in their performance in self-directed learning skills.
3. There are statistically significant differences between the experimental groups (A and B) groups and control group (C) in their performance in learners' autonomy.

METHODS

To address the study's questions and evaluate its hypotheses, the current study used a sequential explanatory mixed-methods

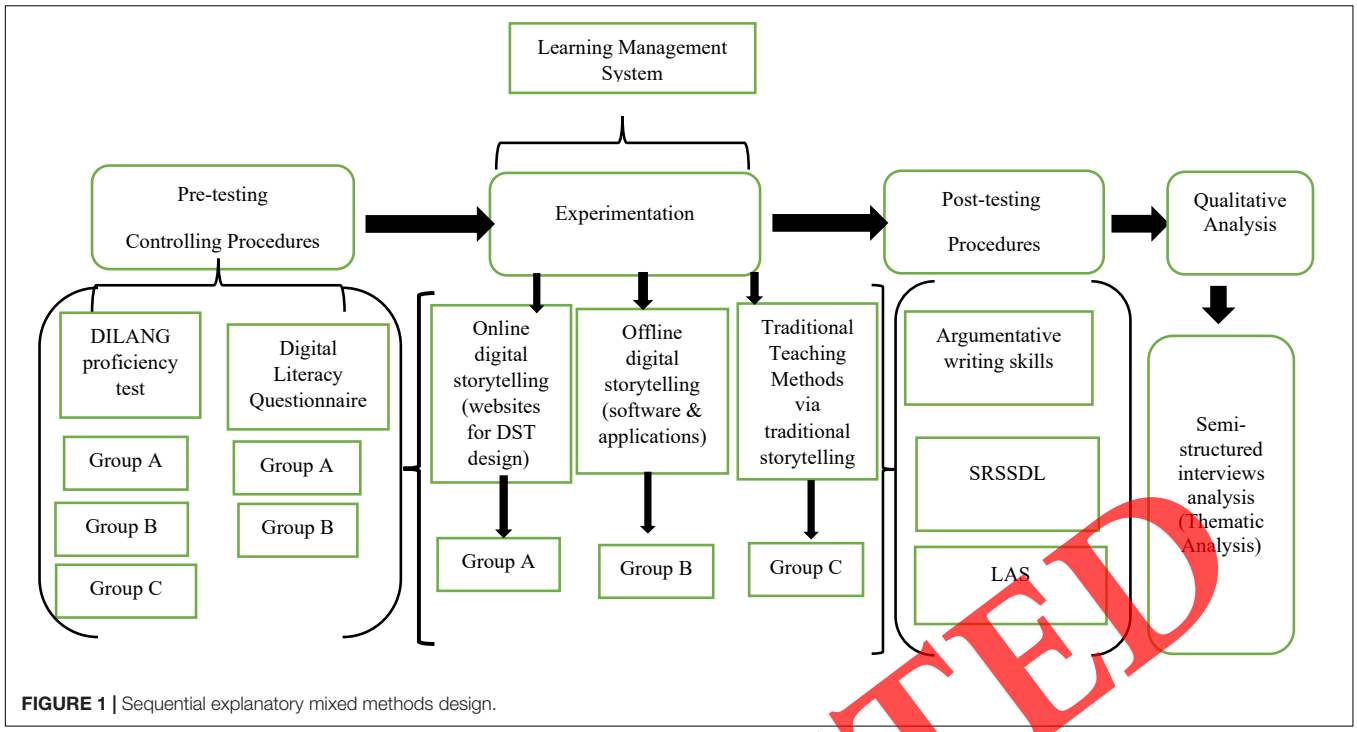

FIGURE 1 | Sequential explanatory mixed methods design.

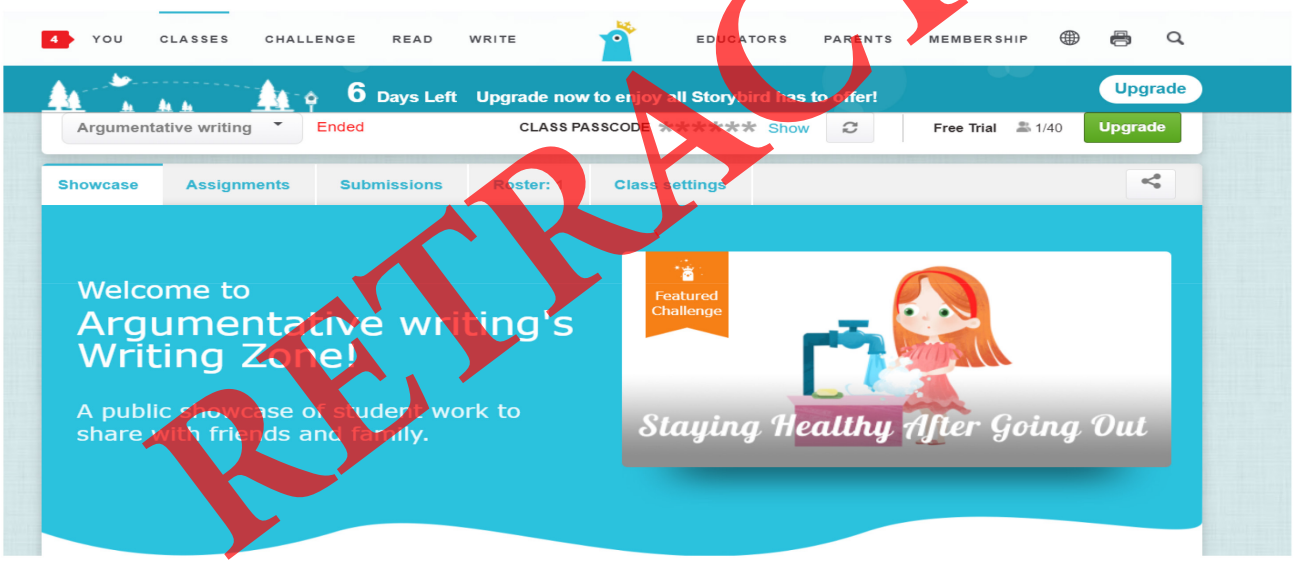

FIGURE 2 | Screenshot of the Storybird website used for Group A students.

methodology to collect data and conduct various analyses. Sequential Exploratory Mixed Methods Design (see **Figure 1**) (Creswell et al., 2003; Tashakkori and Teddlie, 2003; Creswell and Plano Clark, 2007; Riazi and Candlin, 2014) is a research method that examines study participants' previous experiences as well as their current thoughts and actions by analyzing both qualitative and quantitative data.

Mixed method research aids in the establishment of appropriate outcome measures. First, exploratory qualitative components tell researchers and practitioners which outcomes are most meaningful and relevant for participants, as well as the best data collection format. In *post hoc* evaluations of intervention effects, qualitative analysis can find why disparities in intervention results arise, uncover new treatment advantages, and investigate barriers to getting the optimal intervention outcomes (Ivankova et al., 2006; Kroll and Morris, 2009).

Students in the first experimental group (group A), who were instructed to create their own digital stories through online

platforms, were given a list of websites for producing digital stories, i.e., *Storybird*. Students went to this website and started creating their own stories to complement the target abilities (see **Figure 2**).

Students in the second experimental group (group B) were given a list of computer software or mobile applications—mainly offline—to use to create digital stories to help them improve their target abilities. Among the software and applications recommended were *Photostory 3*, *WeVideo*, and *Toontastic*. These applications have been selected for their simplicity and suitability for the participants.

The intervention is primarily determined by the process writing technique. In contrast to the product approach, which concentrates on the finished product, the process approach to writing emphasizes the steps writers take to reach the final draft. According to Salem (2008), because of the flaws of the product approach, instructional techniques have switched their focus from the written finished product to the process of writing, readers and writers continue in their endeavors to grasp and be comprehended. The emphasis is now on the various methods and cognitive activities that the writer engages in while writing.

Context and Participants

Three intact classes were employed; two classes were assigned as experimental groups at random, while the third class served as a control group. Group A consists of 21 EAP learners (prospective teachers of English), while group B consists of 25 students aged 18–22 who are enrolled in an academic English course at Hurghada College of Education as one of their credit-hours courses. The control group (C) consists of 20 students of the same age range and attending the same college. The study participants' language proficiency was assessed using the admission test, which is one of the college entrance requirements, and DIALANG, an online adaptive diagnostic web-based assessment tool. The DIALANG test results, which were presented in levels ranging from B1 to C2, indicated that the participants' writing skills in both groups were at the B1 level.

To ensure that the results are attributed solely to the effect of the current study's online and mixed learning methodologies, students in all groups completed DIALANG to assess their basic English language proficiency level. Furthermore, because the two experimental groups, who learned to produce online and offline digital storytelling, have similar digital literacy backgrounds, a digital literacy scale measure was employed to confirm their comparability.

Materials and Instruments

Dialang English Proficiency Test

DIALANG is an online diagnostic system that assesses non-native English speakers' abilities in 14 European languages. Reading, writing, listening, grammar, and vocabulary knowledge are the skills examined, with speaking being eliminated for technological reasons. DIALANG was created primarily for European individuals to assess their language ability using Europe's Common European Framework of Reference—CEFR—as a foundation for determining language proficiency. The CEFR is a generally accepted framework for describing and measuring a learner's language competency level in a specific language. DIALANG test-takers are not restricted by age. However, it is crucial to note that the assignments produced and designed by DIALANG address themes that may not be engaging to young students (Alderson and Huhta, 2005).

Digital Literacy Questionnaire

Before implementing online DST-based instructional practices or even offline software to produce and implement DST, both the experimental and first control groups completed the Digital Literacy Questionnaire (DLQ) (Son et al., 2017) to ensure that both groups had a similar digital literacy background. Digital literacy refers to the capacity to use digital technology or to incorporate novel technologies into one's learning (Ng, 2012). DLQ is made up of 10 items that are graded on a 5-point Likert scale. It evaluates participants' fundamental attitudes toward digital technologies, which indicate their ability to use such equipment competently. Equivalent scores on the DLQ ensure that the improvements in participants' scores may be attributed to the study's sheltered online environment. Cronbach alpha in the present study was 0.93 for the digital literacy questionnaire.

Argumentative Writing Skills

The participants' argumentative writing skills were provided as one of the prerequisites for the credit hours system, based on the required course students' study. It was based on the IBT TOEFL writing tasks. However, the assessment of the students' essays differed from that of the IBT TOEFL test in those students were requested to write an argumentative essay in no more than 30 min with a word count of 300. Participants' academic writing skills were evaluated using writing band descriptors in four areas: task achievement, coherence and cohesion, lexical resource, and grammatical range and accuracy. The argumentative writing skills were scored on a scaled rubric, with participants receiving a mark ranging from 0 to 30 for the writing test. Students' scores range from 0 to 30, with 0 indicating no written result, 1–16 indicating limited writing competence, 17–23 indicating fair writing skills, and 24–30 indicating high mastery of target argumentative writing skills. To eliminate subjectivity in rating participants' works, two different raters rated the participants' writings in addition to the researcher, and the total points given by the three raters were divided by three to reach the average argumentative writing scores. Cronbach alpha in the present study was 0.87 for the argumentative writing skills test.

Self-Rating Scale of Self-directed Learning

To investigate the improvements in EAP students' self-directed learning skills. The self-rating scale of self-directed learning (SRSSDL) skills developed by Williamson (2007) was employed. The SRSSDL framework featured a brief profile of learners as well as general instructions on how to utilize the scale. The SRSSDL had 60 items divided into five broad categories of self-directed learning each category consists of 12 items: (I) awareness, (II) Learning strategies, (III) learning activities, (IV) evaluation, and (V) interpersonal skills.

All the SRSSDL items were stated positively. For each item, the "always" response was given a score of 5 and the "never" response was given a score of 1. As a result, the maximum and minimum achievable SRSSDL scores were 300 and 60, respectively. To interpret responses, a score sheet was created (Alshaye, 2021). Cronbach alpha in the present study was 0.87 for learning strategies, 0.93 for learning activities, 0.91 for evaluation, 0.88 for interpersonal skills, and 0.89 for the whole scale.

Learner Autonomy Scale

The Learner Autonomy Scale (LAS) (Orakci and Gelisli, 2017) was used to investigate the improvement in learner autonomy levels. LAS assesses students' level of learner autonomy in the English language learning process. A high score on the scale indicates that students have a high amount of learner autonomy, whilst low scores indicate that students have a low level of learner autonomy. LAS is made up of 14 items that are scored on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Cronbach alpha in the present study was 0.94 for the whole scale.

RESULTS

The Quantitative Analysis

Table 1 presents the results of the one-way ANOVA which examines the impact of implementing online DST, offline storytelling, and traditional storytelling strategy on the post-tests of the participants' argumentative writing skills after controlling for the pre-tests (i.e., covariates).

Table 2 presents the results of the one-way ANOVA which examines the impact of implementing online DST, offline storytelling, and traditional storytelling strategy on the post-tests of the participants' self-directed learning skills after controlling for the pre-tests (i.e., covariates). Based on the mean scores of the three groups, online DST designers, offline DST designers, and traditionally taught students achieved the mean scores: $M = 20.90$, $M = 27.04$, $M = 15.00$, respectively.

TABLE 1 | ANOVA of self-directed learning skills.

Dependent variable	Type I sum of squares	df	Mean square	F	Sig.
Awareness	2713.410	65	1356.705	63.361	0.000
Learning strategies	3037.813	65	1518.907	89.601	0.000
Learning activities	3729.179	65	1864.590	112.546	0.000
Evaluation	3363.315	65	1681.657	73.206	0.000
Interpersonal skills	3457.180	65	1728.590	91.459	0.000
Total	81119.615	65	40559.807	162.409	0.000

TABLE 2 | ANOVA of argumentative writing skills.

Dependent variable	Type I sum of squares	Df	Mean square	F	Sig.
Argumentative writing skills	1659.038	65	829.519	258.268	0.000

Table 1 presents the results of the one-way ANOVA which examines the impact of implementing online DST, offline storytelling, and traditional storytelling strategy on the post-tests of the participants' autonomy levels after controlling for the pre-tests (i.e., covariates). The mean scores of the total scores in the self-directed learning skills of the three groups; online DST designers, offline DST designers, and traditionally taught students, are $M = 178.14$, $M = 230.33$, and $M = 146.36$, respectively.

Table 3 presents the results of the one-way ANOVA which examines the impact of implementing online DST, offline storytelling, and traditional storytelling strategy on the post-tests of the participants' autonomy levels after controlling for the pre-tests (i.e., covariates). The mean scores of the total scores in the learners' autonomy of the three groups; online DST designers, offline DST designers, and traditionally taught students, are; $M = 41.63$, $M = 53.85$, and $M = 36.88$, successively respectively.

The results in **Tables 1–3** indicate that after controlling for the pre-tests, producing and using digital stories through offline software and applications (blended learning) had a significant and positive impact on the post-tests of the experimental group EAP learners' argumentative writing skills, self-directed learning skills, and level of autonomy among language learners. Group (B) learning through online websites also achieved a high, it is only a little bit lower than the blended learning experimental group. The least achievement was that of the group (C), which was taught through the traditional storytelling strategy. It could thus be suggested that blended learning serves as an effective tool for students to produce content-based digital stories to enhance digital, literacy, and thinking skills. Online learning also proved to be effective in promoting the target skills but with a certain restraint. Both approaches are shown to be effective in developing EAP learners' argumentative writing skills, self-directed language learning skills, and increasing learners' autonomy levels with priority to the blended learning approach. The least to achieve is the control group, which was taught using a traditional storytelling strategy.

The Qualitative Analysis

The philosophy of qualitative inquiry is important not only from a scholarly standpoint but also as an integral part of the educational profession because it emphasizes the immense and manifold complexity of human experience and the social-cultural environment in which children and educators function (Denzin and Giardina, 2008). Qualitative inquiry deals with the subjective encounter of participants' and researchers' various realities. It tries to convey the truth as constructed by the researcher through the participant's eyes in the event's natural setting (Kacen and Krumer-Nevo, 2010; Sha'anan, 2015).

To assess students' perceptions concerning the use of online DST in language learning, especially in developing argumentative writing skills as well as enhancing their ability to participate actively in their learning, transcribed semi-structured interviews were analyzed. Thematic analysis resulted in some themes, which were presented in **Table 4**.

TABLE 3 | ANOVA of learners' autonomy scores.

Dependent variable	Groups	Mean scores	Type I sum of squares	df	Mean square	F	*p*-value
Learners' autonomy	Online digital storytelling	41.63	3422.918	65	1711.459	129.309	0.000
	Offline digital storytelling	53.85					
	Traditional storytelling	36.88					

TABLE 4 | Themes of the EAP learners' attitudes and perceptions toward the impact of online DST on argumentative writing skills, self-directed learning skills, and levels of autonomy in learning.

No.	Themes
1	Using offline tools through blended learning is fruitful to produce digital stories as it maximizes the opportunities to learn at our pace.
2	With the use of offline software and applications sessions, students work cooperatively in groups, they help each other within their team and their colleagues in other teams.
3	Offline computer-mediated learning supports collaborative learning that allows students to encourage and support each other, initiate inquiries, and get immediate feedback.
4	Based on its ability to instill self-confidence for better performance, DST prepares students for learning experiences where they interact personally with others,
5	The use of offline software and applications to design digital stories allows students to have an active role in the learning process.

Findings generally indicated positive perceptions and attitudes of language learners toward producing and implementing online DST in enhancing students' academic achievement in argumentative writing skills; it also has a positive effect on promoting self-directed learning skills and learners' autonomy. These findings corroborate the quantitative findings of the testing process's statistical analysis. As a result, mixed-method analysis of both quantitative and qualitative data obtained from statistical treatment of testing processes, as well as semi-structured interviews with participants following the experimentation, are combined to support the effectiveness of online DST in language learning.

Positive attitudes toward using offline software and applications to create digital stories that promote target skills were expressed in students' casual responses, for example:

> ***Student1:*** The use of offline software and applications to create digital stories, provides a powerful learning experience that capitalizes on our interest in technology and digital literacy skills. The process of researching, organizing, and creating digital stories provides an authentic opportunity to practice essential literacy skills in areas such as language skills.
>
> ***Student 2:*** Using offline software and applications to create digital stories implies more than just a focus on technology; a powerful digital story cannot exist without powerful writing. As a result, creating digital stories is not an end in itself; it also includes the development of literacy skills in the long run. Students read, research, and even create soundtracks as part of the process of creating digital stories; however, the heart of a powerful digital story is a well-written script. As a result, while digital stories can be brief and time-consuming, they usually contain at least 300 words or more.

Creating digital stories necessitates not only increased digital literacy but also a highly developed written script. When students create their own digital stories, they can combine their digital and literacy skills. A well-written script of a story based on students' research typically begins with 500–1,000 words. Following that, students work down to make the story more concise, focusing on precise language for powerful communication. The editing and reduction processes assist them in getting to the heart of the issue they are researching.

DISCUSSION

The current research aimed to investigate how a DST intervention in a language course affects EFL pre-service instructors at the university level. It is feasible to infer that the DST strategy had a favorable impact on the literacy development and disciplinary knowledge of EFL pre-service teachers in English. By the end of the course, all of the research participants had shown a favorable shift in their written responses after graduation, frequently going from unstructured to multistructural or relational levels of thought (Biggs and Collis, 1982). The two groups that achieved the greatest benefits were pre-service instructors who used online DST and mixed storytelling strategy. These findings add to the body of knowledge about the effect of DST in improving students' writing (Angay-Crowder et al., 2013; Papadopoulou and Vlachos, 2014; Rubino et al., 2018; Chubko et al., 2020).

In this study, using a digital storytelling strategy improves the argumentative writing skills of pre-service teachers. Argumentative writing skills are increasingly important to improve for university students, particularly pre-service teachers, as one of the twenty-first century competencies (Sawitri, 2019). Student-teachers who participated in traditional storytelling assignments that did not incorporate DST (Groups C) did not achieve the same gains as their peers who utilized both online DST and DST software mixes. Notably, the adoption of DST had a considerable impact on the concept acquisition of students (Chubko et al., 2020).

According to Lam et al. (2017), there is a considerable improvement in students' argumentative writing when a blended learning strategy (offline DST) is used instead of a teacher-led direct-instruction strategy. Through external input, blended learning allows students to reflect on and improve their argumentative writing process (Lee et al., 2013). However, these findings contrast those of Rahimi and Yadollahi (2017),

who found that online platforms for making digital stories outperformed offline resources in terms of developing EFL learners' literacy abilities.

According to Tuomainen (2016), blended learning is a popular learning method in higher education since it blends online and face-to-face classroom learning. Using blended learning for English for Academic Purposes (EAP) with non-native university students in language learning environments might provide problems ranging from techniques and materials to student views. Due to the flexibility and convenience of blended learning, the adoption of an EAP course for academic writing and presenting skills was found to be advantageous in strengthening the target competencies. It improves pedagogical richness for teachers of EAP students in higher education by utilizing diverse educational opportunities in constructing the ideal combination of onsite and online learning for each course and set of learning outcomes (Lim and Morris, 2009; Glazer, 2011; Moskal and Cavanagh, 2014; Stein and Graham, 2014).

Digital stories can be utilized as an instructional tool to maximize learners' opportunities to study at their speed. Instructors pay close attention to individual variations among their pupils, and students with varying levels of performance, and engage them in the learning process so that they get better results. During DST sessions, students work in groups and help each other inside their team as well as their colleagues in other teams. In the classroom, delivering fast feedback improves collaboration. Collaborative learning enables students to encourage and assist one another, begin queries, and collaborate to attain an academic goal.

Regardless of the techniques used to create it—online web-based tools or offline software/applications—digital stories instill self-confidence for improved performance. They also prepare students for learning experiences in which they interact personally with others, develop their communication skills, and improve their performance through peer supervision and reflection. As a result, digital stories enable students to participate actively in the learning process. When students create their digital narrative, they feel more in control of their learning.

Producing and utilizing digital stories improves digital, cultural, and literacy skills, as well as dealing with the multiliteracies approach to language learning, which empowers learning and teaching engagement (Navehebrahim, 2011). Adopting a DST strategy is a wise response for communities thirsty for technology in an era characterized by the technomania phenomenon. It is thought that employing DST promotes active learning, deep learning, and even active deep learning at advanced phases. A tale is a powerful instructional tool that allows for in-depth learning. Active learning strategies in the classroom assist learners in becoming interested in the teaching resources, engaged with the tasks and activities, and eventually autonomous in applying the information in everyday life circumstances. As a result, including digital and literacy skills into digital stories promotes self-directed learning and autonomy through active engagement in learning. One of the most significant parts of the learning criteria for twenty-first century learning outcomes is students' self-directedness, engagement, and autonomy.

CONCLUSION

Research into the uses of DST in various disciplines is gaining traction; DST is conquering new countries daily, and it is gaining traction in educational settings. DST, on the other hand, is not a super-hero teaching method because it necessitates a promising learning environment. The extensive use of DST in educational contexts is owing to the constructs on which it is built, which include constructivism, student-centered learning, active learning, deep learning, and reliance on web-based learning and problem-based learning theoretical frameworks.

DST is beneficial in improving students' performance throughout their school and university studies. DST is effective not only in promoting academic accomplishment, but also in enhancing thinking abilities, particularly higher-order thinking skills such as higher-level Bloom's taxonomy, critical and creative thinking skills, and so on (Alshaye, 2021). Furthermore, it is demonstrated that a sense of ownership and responsibility for the learning process significantly improves levels of involvement, engagement, and autonomy in learning.

Educational Implications

Finding revealed that both offline and online digital storytelling applications proved to be effective in developing argumentative writing skills, self-directed learning skills, and learner autonomy. Using digital stories through offline software and applications had a positive impact on the post-tests of the experimental group EAP learners' argumentative writing skills, self-directed learning skills, and level of autonomy among language learners. It could thus be suggested that blended learning serves as an effective tool for students to produce content-based digital stories to enhance digital, literacy, and thinking skills. Online learning also proved to be effective in promoting the target skills but with a certain restraint. The least to achieve is the control group, which was taught using a traditional storytelling strategy.

Digitally designed stories showed to be useful for EFL pre-service teachers and in-service teachers. Teachers are therefore encouraged to use digital storytelling strategy—whether offline or online—in developing different writing genres. DST should also be implemented as an online learning strategy to enhance the four basic language skills: writing, reading, speaking and listening. DST represents one of the most promising educational strategies for improving students' argumentative essay writing and learning is online peer feedback. Peer feedback, for example, has been shown to improve students' writing quality (Noroozi et al., 2016; Huisman et al., 2018; Noroozi and Hatami, 2019; Valero Haro et al., 2019), as well as students' feedback quality (Gielen and De Wever, 2015; Noroozi et al., 2016; Huisman et al., 2018).

LIMITATIONS

Even though this study had a decent number of university students participating, the number of students in each intervention group was minimal. As a result, the main constraint of this study is the limited sample size, which was addressed by employing multiple case-study methodologies. There were

also some discrepancies in the interventions, which restricts the interpretation of the comparison of the three cases.

Furthermore, the possibility for university students, pre-service teachers, to use their L1 in the course was essential to increase paired cases, but this has ramifications for interpreting discrepancies between responses written in their L1 vs. English. Finally, the pupils' gender was not considered in the current data analysis. More research is needed to include students' gender as an independent variable in the data analysis. Additionally, pupils' digital literacy is a factor that can either positively or negatively influence their performance. Further research in these areas is recommended to gain a full picture of utilizing ICT in storytelling strategies to improve EFL pre-service instructors.

In addition, the discrepancy between male and female participants in their performance in study variables, i.e., argumentative writing skills, self-regulated learning skills, and learner autonomy hasn't been focused on. Therefore, types of students' characteristics mainly their gender may influence the study results, several studies have shown that participants' gender influence students' writing skills (see Noroozi et al., 2017, 2022). This research gap should be filled in future research.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

All procedures followed were following the ethical standards of the responsible committee on human experimentation (Sadat Academy for Management Sciences Committee of Scientific Research Ethics) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all students for being included in the study.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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