

## DEVELOPING AUTHORIAL VOICE: A LONGITUDINAL STUDY OF DIGITAL STORYTELLING'S IMPACT ON ADOLESCENT L2 WRITERS' SYNTACTIC COMPLEXITY

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### Abstract

Digital transformation in language education has reshaped how adolescent second language (L2) learners engage with writing, particularly through multimodal pedagogies such as digital storytelling, which offer new spaces for expression and identity construction. This study aims to investigate the longitudinal impact of digital storytelling on the development of syntactic complexity and authorial voice among adolescent L2 writers. A longitudinal mixed-methods design was employed involving forty-eight secondary school learners over one academic semester. Data were collected through three phases of digital storytelling scripts, analyzed using corpus-based syntactic complexity indices, complemented by qualitative textual analysis and learner reflections. The results demonstrate significant and sustained growth in syntactic complexity, including increased clause embedding, sentence elaboration, and structural variation across time. Qualitative findings indicate that these syntactic developments were closely associated with stronger authorial voice, reflected in clearer narrative stance, evaluative language, and enhanced writer presence. The findings suggest that digital storytelling supports syntactic development as a meaning-driven and functional process rather than a purely formal outcome. The study concludes that sustained integration of digital storytelling in L2 writing instruction can effectively foster both linguistic sophistication and expressive agency among adolescent learners, highlighting the pedagogical value of longitudinal, narrative-based digital writing practices globally today.

**Keywords:** Authorial Voice, Digital Storytelling, Syntactic Complexity



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## INTRODUCTION

The introduction opens by situating second language (L2) writing development within the broader context of global digital transformation in education. Adolescents increasingly engage with multimodal digital environments that reshape how language is produced, represented, and interpreted (Mankevich et al., 2025; Song et al., 2025). Writing instruction in L2 contexts has gradually shifted from a sole emphasis on grammatical accuracy toward more holistic goals that include meaning-making, identity expression, and voice construction. Digital storytelling emerges as a pedagogical approach that integrates linguistic, visual, and narrative resources, offering learners new affordances to construct meaning while engaging cognitively and affectively in writing tasks (Namaziandost & Çakmak, 2025; Richardson & Wilson, 2024).

The background further frames authorial voice as a central yet contested construct in L2 writing research. Authorial voice refers to the writer's ability to express stance, agency, and identity through linguistic choices, particularly through syntactic and discourse-level features (Ferreira & Kendrick, 2025; Tan et al., 2025a). For adolescent L2 writers, developing an authorial voice is often constrained by limited linguistic resources, instructional practices focused on form, and assessment systems privileging surface-level accuracy. These constraints frequently result in writing that is syntactically simple, risk-averse, and lacking in expressive depth, despite learners' communicative intentions (Mackenzie, 2024; Thomson et al., 2025).

The background situates syntactic complexity as a key indicator of advanced writing development and authorial control. Syntactic complexity reflects learners' ability to deploy varied and embedded sentence structures to convey nuanced meanings. Longitudinal research in L2 writing suggests that syntactic development unfolds gradually and is sensitive to instructional context (Schreyer et al., 2025; Tan et al., 2025b). Digital storytelling, with its iterative drafting processes, narrative orientation, and audience awareness, offers a potentially powerful environment for fostering sustained syntactic growth alongside voice development. This intersection of technology, language development, and identity formation establishes the conceptual foundation of the study (Darville-Sanders et al., 2025; Gita et al., 2025).

The problem addressed in this study concerns the persistent difficulty adolescent L2 writers face in developing a recognizable authorial voice alongside increasing syntactic complexity (Alalem, 2023). Despite years of formal instruction, many learners continue to produce texts characterized by short, formulaic sentences and limited syntactic variation. Writing pedagogy in many L2 classrooms remains dominated by exam-oriented practices that emphasize grammatical correctness over expressive capacity, discouraging learners from experimenting with more complex structures (Erdoğan & Altay, 2025).

The problem is compounded by the limited integration of longitudinal perspectives in technology-enhanced L2 writing research (Chang et al., 2023). Existing studies on digital storytelling often focus on short-term interventions or motivational outcomes, providing limited insight into how sustained engagement with digital storytelling influences syntactic development over time. As a result, the developmental trajectories of adolescent writers remain underexplored, particularly in relation to how voice and syntactic complexity co-evolve (Mathisen et al., 2025).

The problem also lies in the conceptual separation between authorial voice and syntactic complexity in prior research. Voice is frequently treated as a subjective or stylistic phenomenon, while syntactic complexity is examined through quantitative measures detached from meaning-making processes (Zschaebitz et al., 2024). This separation obscures how syntactic choices function as resources for expressing voice. Addressing this problem requires an integrated approach that examines how digital storytelling mediates both linguistic development and the emergence of authorial voice across time (Benabbes & AbdulHaleem Abu Taleb, 2024; Guo et al., 2025).

The primary objective of this study is to examine the longitudinal impact of digital storytelling on the development of syntactic complexity in adolescent L2 writers. The study

seeks to trace changes in learners' syntactic patterns across multiple writing cycles, focusing on how exposure to narrative-based, multimodal composition tasks influences sentence-level and clause-level complexity (Mpofu-Mketwa et al., 2023).

A second objective is to investigate how syntactic development contributes to the construction of authorial voice in L2 writing. The study aims to identify linguistic features through which learners express stance, agency, and narrative presence, and to examine how these features evolve as learners gain greater syntactic control. Attention is directed toward the functional use of complex syntax rather than complexity as an abstract metric (Griew et al., 2024; Utomo & Day, 2025).

A further objective is to explore digital storytelling as a pedagogical space that supports sustained writing development. The study aims to understand how iterative drafting, audience awareness, and multimodal design shape learners' engagement with language over time. By adopting a longitudinal design, the research seeks to capture developmental patterns that are not visible in short-term instructional studies (Göğebakan Yıldız & Atman Uslu, 2024; Liang & Hwang, 2023).

A review of existing literature reveals extensive research on syntactic complexity in L2 writing, particularly using corpus-based and cross-sectional designs. These studies have contributed valuable insights into developmental patterns across proficiency levels (Molder et al., 2025; Palioura & Sapounidis, 2025). However, they often rely on decontextualized writing tasks and overlook the pedagogical environments in which syntactic development occurs.

Research on digital storytelling in L2 education has primarily emphasized learner motivation, engagement, and multimodal literacy. While some studies report improvements in writing quality, few have systematically examined syntactic complexity as a developmental outcome. Even fewer studies adopt longitudinal designs that allow researchers to observe how syntactic growth unfolds over extended instructional periods (Aditya et al., 2024; Ramezanzadeh & Ebadi, 2025).

A critical gap also exists in studies that explicitly link digital storytelling to authorial voice development. Voice is frequently discussed in qualitative terms without rigorous linguistic analysis, while quantitative studies of syntax rarely consider identity or voice (Zhao et al., 2025). The lack of integrative frameworks limits understanding of how digital storytelling supports both linguistic sophistication and expressive capacity. This study addresses these gaps by combining longitudinal analysis, syntactic measurement, and voice-oriented interpretation within a single research design.

The novelty of this study lies in its longitudinal examination of digital storytelling as a mediating tool for syntactic complexity and authorial voice development in adolescent L2 writers. Unlike short-term intervention studies, this research captures developmental change across time, providing insight into how sustained pedagogical practices shape writing development. The focus on adolescents further contributes novelty, as this population remains underrepresented in longitudinal L2 writing research (Liu et al., 2025; Namaziandost & Çelik, 2025).

Conceptually, the study advances an integrated view of syntactic complexity and authorial voice. Syntax is treated not merely as a formal feature but as a meaning-making resource through which writers construct identity and stance. This perspective challenges traditional separations between linguistic accuracy and expressive voice, offering a more holistic account of L2 writing development.

The justification for this research rests on its pedagogical and theoretical significance. Understanding how digital storytelling supports syntactic growth and voice development can inform curriculum design, teacher training, and assessment practices in L2 writing instruction (Batur & Çakıroğlu, 2023). The study contributes to applied linguistics by bridging technology-enhanced learning, longitudinal writing research, and theories of voice, positioning digital storytelling as a meaningful pathway for developing advanced L2 writing competence.

## **RESEARCH METHOD**

### ***Research Design***

This study adopted a longitudinal mixed qualitative–quantitative research design to examine the impact of digital storytelling on the development of syntactic complexity and authorial voice in adolescent L2 writing. A longitudinal approach was selected to capture developmental changes in learners’ syntactic patterns across multiple instructional cycles rather than isolated outcomes from short-term interventions. The design combined repeated textual analysis of student writing with qualitative interpretation of voice-related features, allowing for an integrated examination of linguistic growth and expressive development over time. Digital storytelling was implemented as a sustained pedagogical intervention embedded within regular writing instruction, enabling observation of naturally evolving writing practices within an authentic educational context (Lohr et al., 2023).

### ***Research Target/Subject***

The population of this study consisted of adolescent learners of English as a second language enrolled in a public secondary school. The sample comprised 48 students aged between 14 and 16 years who shared comparable instructional backgrounds and intermediate-level L2 proficiency. Purposive sampling was employed to select participants who had not previously received formal instruction in digital storytelling and who participated consistently throughout the research period (Adams et al., 2025). The sample included learners from diverse linguistic backgrounds, ensuring variability in language repertoires while maintaining relative homogeneity in age and educational level. Attrition was monitored across the study, and only participants who completed all data collection phases were included in the final analysis

### ***Research Procedure***

The research procedures were implemented over one academic semester and structured into three instructional phases. Initial data collection involved a baseline writing task completed prior to the digital storytelling intervention to establish learners’ initial syntactic profiles. The intervention phase integrated digital storytelling activities into regular writing instruction, requiring students to plan, draft, revise, and publish narrative texts using multimodal digital platforms (Reyhan & Dağlı, 2024). Ongoing feedback and peer review were incorporated to encourage syntactic experimentation and narrative expression. Final data collection occurred after the completion of the intervention, with students producing a concluding digital story script and participating in reflective interviews. Data analysis was conducted iteratively, combining quantitative comparison of syntactic complexity measures across phases with qualitative interpretation of emerging authorial voice patterns. Ethical considerations, including informed consent and confidentiality, were maintained throughout the study.

### ***Instruments, and Data Collection Techniques***

Multiple instruments were used to collect longitudinal data on syntactic complexity and authorial voice. The primary data source consisted of students’ digital storytelling scripts produced at three instructional phases, serving as the basis for syntactic analysis. Syntactic complexity was measured using established indices such as mean length of T-unit, clause per T-unit ratio, and subordination measures, calculated through corpus-based analysis tools (Bordignon & Domenici, 2025). Supplementary instruments included reflective writing logs and semi-structured student interviews, which provided qualitative insights into learners’ perceptions of voice, agency, and writing development. A rubric-based analytic framework was also employed to identify voice-related linguistic features, including stance markers, syntactic variation, and narrative positioning.

## RESULTS AND DISCUSSION

The dataset consisted of 144 digital storytelling scripts produced by 48 adolescent L2 writers across three data collection phases: pre-intervention, mid-intervention, and post-intervention. Quantitative measures of syntactic complexity were extracted from the scripts using corpus-based analysis tools. The indicators included mean length of T-unit (MLT), clauses per T-unit (C/T), and dependent clauses per clause (DC/C), which are widely recognized as valid indices of syntactic development in L2 writing research.

Descriptive statistics of syntactic complexity across the three phases are presented in Table 1, which shows a progressive increase in all measured indices over time. Secondary instructional data confirmed consistent exposure to digital storytelling tasks and comparable instructional conditions throughout the intervention period.

Table 1. Descriptive Statistics of Syntactic Complexity Across Writing Phases

Measure	Pre-Test Mean (SD)	Mid-Test Mean (SD)	Post-Test Mean (SD)
Mean Length of T-unit	9.84 (1.12)	11.26 (1.34)	13.07 (1.51)
Clauses per T-unit	1.31 (0.18)	1.47 (0.21)	1.66 (0.24)
Dependent Clauses per Clause	0.34 (0.09)	0.41 (0.10)	0.52 (0.12)

The statistical trends indicate a steady increase in syntactic complexity across all indices following sustained engagement with digital storytelling activities. Growth was particularly evident in post-intervention writing, where learners demonstrated greater use of subordination and extended clause structures. These patterns suggest that repeated narrative-based writing cycles provided opportunities for syntactic elaboration beyond sentence-level constructions.

Instructional records and classroom observations support these findings by showing increased revision depth and syntactic experimentation over time. Learners were observed incorporating more complex sentence structures during later drafting stages, reflecting growing confidence in manipulating syntactic resources to support narrative meaning.

Qualitative analysis of the scripts revealed noticeable shifts in syntactic variety and narrative control. Early texts were dominated by simple independent clauses and repetitive sentence patterns (Mutlu & Dağ, 2024). Later texts displayed greater syntactic diversification, including relative clauses, adverbial subordination, and coordinated clause chaining within narrative sequences.

Textual evidence also showed increased alignment between syntactic complexity and expressive intent. Learners used complex sentences to convey temporal progression, causal relationships, and evaluative stance, indicating that syntactic development was functionally motivated rather than mechanically induced.

Repeated-measures ANOVA revealed statistically significant differences across the three writing phases for all syntactic complexity measures. Mean length of T-unit increased significantly from pre-test to post-test ( $p < .001$ ), as did clauses per T-unit ( $p < .001$ ) and dependent clause usage ( $p < .001$ ). Effect sizes ranged from moderate to large, indicating meaningful developmental change.

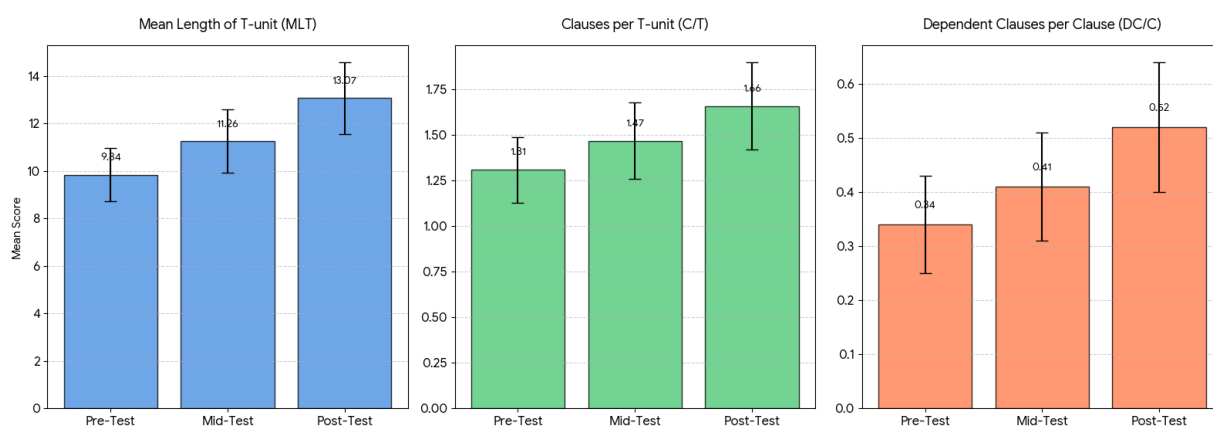


Figure 1. Development of Syntactic Complexity Across Writing Phase

Post-hoc comparisons confirmed that the most substantial gains occurred between the mid-test and post-test phases. These results suggest that sustained exposure to digital storytelling tasks, rather than short-term engagement, played a critical role in supporting syntactic development.

Correlation analysis revealed strong positive relationships between syntactic complexity indices and qualitative markers of authorial voice. Increased clause embedding was associated with higher levels of narrative stance, elaboration, and writer presence. Learners who demonstrated greater syntactic growth also produced texts with clearer narrative positioning and evaluative language (Rodney et al., 2025).

Longitudinal comparison further showed that syntactic complexity and authorial voice developed in tandem rather than independently. This relationship suggests that syntactic growth functioned as a linguistic resource enabling more sophisticated expression of identity and agency in L2 writing.

One representative case involved a 15-year-old learner whose pre-test script consisted largely of short declarative sentences with minimal subordination. The narrative relied on chronological listing of events with limited descriptive depth. Sentence structures were predominantly simple and repetitive.



Figure 2. Syntactic Complexity and Authorial Voice

The post-test script from the same learner demonstrated extensive use of embedded clauses, temporal adverbials, and evaluative constructions. The narrative voice became more prominent, with syntactic complexity supporting reflection, emotional engagement, and audience awareness.

Analysis of this case illustrates how digital storytelling facilitated gradual syntactic expansion through iterative drafting and multimodal planning. The learner reported increased

willingness to experiment with longer sentences to convey complex ideas and emotions. Revision practices encouraged syntactic restructuring rather than surface-level correction (Hoveskog & Björkén-Nyberg, 2025).

Interview data further indicated that narrative ownership and audience orientation motivated syntactic risk-taking. The learner perceived complex sentences as necessary tools for expressing personal meaning rather than as abstract grammatical requirements.

The results demonstrate that digital storytelling supports sustained growth in syntactic complexity among adolescent L2 writers. Quantitative gains are complemented by qualitative evidence showing functional and meaningful use of complex syntax in narrative contexts.

Interpretation of these findings suggests that syntactic complexity and authorial voice are mutually reinforcing dimensions of L2 writing development. Digital storytelling provides a pedagogical environment in which learners can integrate linguistic sophistication with expressive agency over time.

The findings of this longitudinal study demonstrate that sustained engagement with digital storytelling significantly contributes to the development of syntactic complexity in adolescent L2 writing (Kalantari et al., 2023). Quantitative results show consistent increases in mean length of T-units, clause density, and subordination over time, indicating progressive syntactic elaboration rather than isolated improvement. These gains were most pronounced during the later stages of the intervention, underscoring the importance of extended instructional exposure.

The results also reveal that syntactic growth was accompanied by qualitative changes in how learners expressed meaning. Learners increasingly used complex syntactic structures to convey temporal sequencing, causality, and evaluation within their narratives. Such patterns suggest that syntactic complexity developed as a functional resource for meaning-making rather than as a mechanical outcome of instruction.

Evidence from textual analysis and learner reflections indicates that authorial voice became more salient as syntactic resources expanded. Learners demonstrated greater narrative presence, clearer stance-taking, and stronger audience awareness. These features signal a shift from formulaic writing toward more personalized and expressive L2 texts.

The convergence of quantitative and qualitative findings supports the conclusion that digital storytelling provides a pedagogical environment conducive to both linguistic development and voice construction. Syntactic complexity and authorial voice emerged as interrelated dimensions of writing development rather than separate instructional targets.

The findings align with prior research demonstrating that syntactic complexity develops gradually and is sensitive to task type and instructional context. Studies on narrative writing have similarly reported higher levels of syntactic elaboration compared to expository tasks, particularly when learners are encouraged to construct extended meaning. This study reinforces those conclusions by showing that narrative-oriented digital tasks foster sustained syntactic growth.

Differences emerge when compared with short-term digital storytelling studies that primarily emphasize motivation and engagement. While earlier research often reports affective benefits, the present findings extend this literature by demonstrating measurable linguistic development across time. The longitudinal design offers evidence that digital storytelling supports durable changes in syntactic behavior rather than temporary performance effects (Steinhausser & Lugin, 2024).

The results also contrast with research that treats syntactic complexity and authorial voice as analytically separate constructs. Corpus-based studies frequently examine syntactic growth independently of expressive dimensions, while qualitative studies of voice often lack systematic linguistic measurement. This study bridges these strands by showing how syntactic resources enable voice development in L2 writing.

Comparisons with form-focused instructional studies further highlight the distinct contribution of digital storytelling. Whereas grammar-centered approaches often yield limited transfer to extended writing, the findings suggest that meaning-driven, multimodal composition creates conditions for syntactic experimentation and expressive risk-taking.

The findings signal that syntactic complexity functions as an index of developing authorial agency rather than solely as a marker of linguistic proficiency. Increased clause embedding and sentence expansion reflect learners' growing capacity to manage discourse-level meaning and narrative perspective. Syntactic development thus becomes a visible trace of emerging writer identity.

The results also indicate a shift in learners' orientation toward writing. Early texts reflected cautious, accuracy-driven production, while later texts demonstrated greater willingness to manipulate syntax to achieve communicative goals. This shift suggests that learners began to perceive syntax as a flexible resource rather than a constraint.

Patterns observed across cases point to digital storytelling as a space where linguistic form and personal meaning converge. Multimodal planning and narrative ownership appear to reduce affective barriers, allowing learners to experiment with complex structures without fear of error. The findings reflect a reconfiguration of classroom writing norms toward expressive legitimacy.

The study also signals broader implications for how adolescent L2 writers develop voice over time. Voice emerges not as an innate quality but as a product of sustained interaction between linguistic resources, pedagogical design, and opportunities for self-expression.

The findings carry important implications for L2 writing pedagogy. Writing instruction that integrates digital storytelling can support syntactic development without isolating grammar from meaning. Educators can leverage narrative and multimodal tasks to encourage syntactic elaboration in authentic communicative contexts.

Curriculum design implications include the need to prioritize longitudinal writing development rather than discrete skill acquisition. Sustained engagement with iterative writing tasks allows learners to internalize syntactic patterns and apply them flexibly. Digital storytelling provides a structured yet open-ended framework for such engagement (Shadaan, 2025).

Assessment practices also require reconsideration in light of these findings. Traditional assessments emphasizing sentence-level accuracy may overlook meaningful syntactic growth associated with voice development. Rubrics that account for syntactic variety, narrative coherence, and stance expression may better capture learners' progress.

The findings further suggest implications for teacher education. Teachers need support in designing technology-enhanced writing tasks that balance linguistic scaffolding with creative autonomy. Understanding the relationship between syntax and voice can inform more responsive feedback practices. The observed outcomes can be explained by the narrative nature of digital storytelling, which inherently demands syntactic elaboration to express sequence, causality, and evaluation. Narrative construction encourages learners to move beyond simple clauses to convey layered meaning, thereby promoting syntactic growth.

The iterative drafting process embedded in digital storytelling also contributes to syntactic development. Repeated cycles of planning, revising, and publishing provide opportunities for restructuring sentences and experimenting with complexity. Learners gradually gain control over syntactic choices through sustained practice.

Multimodal composition further supports syntactic risk-taking by distributing meaning across visual, auditory, and textual modes. This distribution reduces cognitive load on linguistic production alone, enabling learners to focus on refining sentence structures within a supportive expressive environment (Mete İzci & Çetinkaya, 2024). Social dimensions of digital storytelling, including peer feedback and audience awareness, also explain the outcomes.

Writing for an audience motivates learners to clarify meaning and enhance expression, prompting more deliberate and complex syntactic constructions.

Future research should extend longitudinal investigations to diverse educational contexts and proficiency levels to examine the generalizability of these findings. Comparative studies across instructional approaches can further clarify the specific contributions of digital storytelling to syntactic and voice development. Methodological expansion is also needed to integrate discourse-level and functional analyses with traditional syntactic metrics. Combining systemic functional linguistics or complexity theory with corpus-based measures could deepen understanding of how syntactic complexity operates within meaning-making processes.

Pedagogical experimentation should explore variations of digital storytelling, including collaborative and cross-cultural storytelling projects. Such approaches may further enhance voice development and syntactic flexibility through interaction and intercultural engagement. Educational practice should move toward embedding digital storytelling as a sustained component of L2 writing curricula rather than as an isolated activity. The findings support a reorientation of writing instruction toward developmental, expressive, and linguistically rich learning trajectories.

## CONCLUSION

The most important finding of this study is that digital storytelling functions as a sustained pedagogical catalyst for the simultaneous development of syntactic complexity and authorial voice in adolescent L2 writing. Longitudinal evidence demonstrates that learners progressively expanded their syntactic repertoires through increased clause embedding, sentence elaboration, and structural variation, while these linguistic developments were closely aligned with clearer narrative stance, stronger writer presence, and greater expressive agency. This finding differentiates the study from prior research by showing that syntactic complexity is not merely an index of proficiency growth but a functional resource through which adolescent L2 writers construct voice over time.

The primary contribution of this research lies in its conceptual and methodological integration of longitudinal syntactic analysis with qualitative examination of authorial voice within a digital storytelling context. Conceptually, the study reframes syntactic complexity as an enabling mechanism for identity expression and meaning-making rather than a purely formal characteristic of writing. Methodologically, the longitudinal design combined corpus-based syntactic measures with narrative and voice-oriented textual analysis, offering a comprehensive approach to capturing developmental change that extends beyond short-term intervention studies commonly found in technology-enhanced language learning research.

The study is limited by its focus on a single educational context and a relatively homogeneous group of adolescent learners, which may restrict the transferability of the findings to other age groups or instructional settings. The reliance on textual data also limits insight into real-time cognitive processes during writing. Future research should pursue multi-site longitudinal studies involving diverse learner populations and instructional models, as well as incorporate process-oriented methods such as keystroke logging or think-aloud protocols to further illuminate the dynamic relationship between digital storytelling, syntactic development, and authorial voice in L2 writing.

## AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; Investigation.

Author 3: Data curation; Investigation.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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