

Enhancing creative narrative writing skills and multimodal communication competence through a digital storytelling-based project-based learning model

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ABSTRACT

A fundamental gap between the demand for multimodal communication competence in the digital era and conventional, text-centric writing pedagogy in higher education was the foundational problem for this research. This study investigated the effectiveness of an integrated learning model, combining Project-Based Learning (PjBL) and Digital Storytelling (DST), as a solution to simultaneously enhance students' creative narrative writing skills and multimodal communication competence. The research employed a quasi-experimental pretest-posttest nonequivalent control group design involving 60 Indonesian Language and Literature Education students, divided into an experimental group (n=30) and a control group (n=30). The results demonstrated a statistically significant advantage for the experimental group, which exhibited substantially greater improvement in creative narrative writing skills ($t(58) = 20.45, p < .001$) and achieved superior multimodal communication competence scores ($t(58) = 16.98, p < .001$) compared to the control group. The study concluded that the integration of PjBL and DST is an effective and robust pedagogical intervention for equipping students with holistic literacy skills relevant to the 21st century, successfully bridging traditional writing practices with contemporary digital communication demands.

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Introduction

The shifting communication landscape in the digital era has fundamentally transformed the nature of literacy. Literacy is no longer confined to the mastery of linear written text but has evolved into a complex multimodal competence. The theoretical framework of multimodality, pioneered by (Kress & Leeuwen, 2006), posits that meaning in modern communication is constructed through the simultaneous interaction of various modes—such as text, visual images, and audio. Consequently, higher education institutions are required to equip students with the ability to not only consume but also produce multimodal discourse critically and creatively (Lacković & Olteanu, 2023; Lim, 2024). In response to this demand, pedagogical approaches such as Project-Based Learning (PjBL) offer a robust framework for authentic learning (Al-Kamzari & Alias, 2025; Indriati et al., 2024; Retno et al., 2025), while practices like Digital Storytelling (DST) provide an ideal medium for students to apply multimodal competence in a meaningful narrative context (Urbietta & Peñalver, 2025; Wang, 2025).

Despite the global urgency of multimodal literacy, the Indonesian higher education context presents a unique challenge. The national Merdeka Belajar Kampus Merdeka (MBKM) or 'Freedom to Learn' policy strongly advocates for student-centered, project-based learning aimed at developing 21st-century competencies (Kemendikbudristek, 2023). However, a significant gap persists between this policy's vision

and classroom-level implementation, particularly in language teacher education. Many writing instruction programs still adhere to a conventional, text-centric paradigm, focusing on print-based genres (Susanto, 2024; Hastuti et al., 2023). As a result, pre-service teachers may become proficient in composing traditional essays but often lack the pedagogical skills to design or guide the dynamic and persuasive multimodal projects mandated by the new K-12 Kurikulum Merdeka. This instructional gap is critical, as these future educators are the primary agents tasked with implementing the *Kurikulum Merdeka* in schools. A failure to equip them with contemporary multimodal pedagogical skills risks undermining this national educational reform, creating a generation of teachers unprepared for the demands of modern literacy (Susanto et al., 2025).

A review of related literature reveals that the body of research on both Project-Based Learning (PjBL) and Digital Storytelling (DST) has expanded significantly. Several studies have successfully demonstrated the effectiveness of PjBL in enhancing student engagement and autonomy (Christwardana et al., 2022; Khoudri et al., 2023; Maryati et al., 2022; Morais et al., 2021; Widyaningrum & Prihastari, 2023). On the other hand, studies on DST have consistently reported its positive impact on creativity and personal expression (Özen & Duran, 2021; Gürsoy, 2021; Irawan, 2025; Tanrikulu, 2022; Yang et al., 2022; Zarifsanaiey et al., 2022). However, the majority of these studies tend to focus on only one aspect in isolation: some examine PjBL as a general model without a specific digital project, while others investigate DST as a standalone product, devoid of a structured PjBL pedagogical framework. This trend leaves unanswered questions regarding the synergistic effects that emerge when these two approaches are systematically integrated.

Based on this review, a clear research gap is identified: a lack of empirical evidence regarding the effectiveness of a learning model that integrates the Project-Based Learning (PjBL) framework with the creative substance of Digital Storytelling (DST) projects to simultaneously enhance two distinct skill sets—namely, creative narrative writing skills (as the content foundation) and multimodal communication competence (as the digital enactment). This gap is particularly pronounced in the Indonesian language education context, where studies employing experimental designs to test such an intervention are scarce. This study, therefore, aims to address this gap by providing robust empirical data.

The novelty and primary contributions of this study lie in three key aspects. Firstly, the study proposes a systematically designed integration of the PjBL-DST model, rather than a mere conventional project assignment. Secondly, the research conducts a dual-impact assessment by analyzing the enhancement of traditional narrative writing skills alongside modern multimodal communication competence, thereby facilitating a more holistic understanding of students' literacy development. Thirdly, the study offers a practical contribution in the form of a tested and adaptable learning model for language educators, as well as a theoretical contribution by presenting empirical evidence of the synergy between the structure of PjBL and the creativity of DST within the context of pre-service teacher education.

Therefore, this study has the following objectives: (1) to empirically examine the effect of the DST-based PjBL model on the enhancement of students' creative narrative writing skills in comparison to a conventional learning model, and (2) to analyze the impact of the DST-based PjBL model on the improvement of students' multimodal communication competence. The scope of this study is confined to students of the Indonesian Language and Literature Education program at a university in Padang, Indonesia, over one academic semester to ensure the study's internal validity and feasibility.

Method

1. Research Design

This study employed a quasi-experimental design, specifically the Nonequivalent Control Group Pretest-Posttest Design. This design was chosen as it is highly suitable for research in formal educational settings, where the random assignment of participants to groups is difficult to implement due to pre-existing class structures (i.e., intact groups). This design enables researchers to compare the effectiveness of the treatment (the PjBL-DST model) with a control group, thereby allowing for stronger causal inferences than can be drawn from pre-experimental designs. The visual representation of this research design can be seen in Table 1.

Table 1. Research Design Structure

<i>Group</i>	<i>Pretest</i>	<i>Treatment</i>	<i>Post-test</i>
Experimental	O ₁	X	O ₂
Control	O ₃	-	O ₄

Where:

- a. O₁,O₃: Pretest to measure the initial creative narrative writing skills.
- b. X: Treatment, which is the implementation of the Project-Based Learning (PjBL) and Digital Storytelling (DST) model.
- c. - : Conventional instruction (no special treatment).
- d. O₂,O₄: Post-test to measure the final creative narrative writing skills and multimodal communication competence.

2. Participants and Research Context

The participants in this study were 60 fourth-semester students from the Indonesian Language and Literature Education Study Program at Universitas Negeri Padang, enrolled in the Creative Writing course during the 2024/2025 academic year. The study employed a purposive sampling technique, using the intact group method, wherein two pre-existing classes were selected based on considerations of representativeness and accessibility.

One class was assigned as the experimental group (n=30), receiving the PjBL-DST model treatment, while the other was assigned as the control group (n=30), following the conventional learning model. Prior to the intervention, an independent samples t-test was conducted on the pretest scores of both groups to ensure the equivalence of their initial abilities. The results indicated no statistically significant difference between the two groups ($p > 0.05$), thus establishing that both possessed a comparable baseline proficiency.

3. Prosedur Penelitian

The research procedure was conducted systematically in four main stages over a period of 10 weeks.

- a. Preparation Stage (2 weeks):
 - 1) Development of the research instruments (i.e., assessment rubrics).
 - 2) Validation of the instruments through expert judgment.
 - 3) Creation of the semester lesson plans (RPS) and teaching modules for both the experimental group (based on the PjBL-DST model) and the control group (conventional).
- b. Pretest Stage (1 week):

Both groups (experimental and control) were given the same task: to write a complete creative narrative script based on a predetermined theme within a 100-minute timeframe.
- c. Treatment/Intervention Stage (6 weeks):
 - 1) The experimental group underwent instruction based on the PjBL-DST model, which consisted of six main phases: (1) Formulating an essential question (identifying the story to be told), (2) Designing a project plan (creating a storyboard and final script), (3) Creating a schedule (setting deadlines for each production stage), (4) Monitoring student progress (consultation sessions and formative feedback from the lecturer), (5) Assessing the outcome (the digital story production process using applications like CapCut or Canva), and (6) Evaluating the experience (showcasing the final products and group reflection).
 - 2) The control group received conventional instruction, which included lectures on fiction theory, discussions on intrinsic literary elements, analysis of short story examples, and individual text-based creative narrative writing exercises, without the integration of a multimodal project.
- d. Post-test Stage (1 week):

Both groups were assigned an identical final task: to produce a digital story based on a new, given theme. This task was used to measure both their narrative writing skills (assessed through the script and voice-over narration quality) and their multimodal communication competence.

4. Research Instruments

Two primary instruments were used for data collection, both of which underwent a rigorous process of validation and reliability testing.

- a. Rubric for Assessing Creative Narrative Writing Skills: This analytic rubric was designed to measure five aspects: (1) Plot Development, (2) Characterization, (3) Setting Development, (4) Style and Diction, and (5) Originality, using a 1-to-5 scoring scale. The rubric's content validity was established through expert judgment. Two senior faculty members from the Indonesian Language and Literature Education department—one Full Professor with expertise in language pedagogy and one Associate Professor specializing in composition studies—were invited to review the instrument. They assessed the relevance, clarity, and comprehensiveness of each criterion, and their feedback was incorporated into the final version. Inter-rater reliability was confirmed prior to the main data collection. Two of the researchers acted as independent raters and scored a random sample of 10 student narrative scripts (approximately 17% of the total sample) from a pilot group. The resulting scores were analyzed using Cohen's Kappa, yielding a coefficient of $\kappa = 0.85$, which indicates a "very good" level of agreement.

- b. Rubric for Assessing Multimodal Communication Competence: This analytic rubric was developed based on the theoretical frameworks of Kress & van Leeuwen (2006) and Jewitt (2011) to assess four key dimensions: (1) Synergy between Modes; (2) Visual Design Quality; (3) Effectiveness of Audio Use; and (4) Digital Flow and Pace. The validation and reliability procedures for this rubric were identical to the first. Content validity was affirmed by the same two experts. Inter-rater reliability was tested by the same two researchers on a sample of 10 pilot digital stories, resulting in a Kappa coefficient of $\kappa = 0.82$ (also indicating a "very good" category of agreement).

5. Data Analysis Techniques

The quantitative data collected were analyzed using the IBM SPSS Statistics 26 software. The analysis involved both descriptive and inferential statistics.

- a. Descriptive statistics were used to calculate and present the mean scores, standard deviations, and gain scores (the difference between post-test and pre-test scores) for both the experimental and control groups.
- b. For inferential analysis, prerequisite assumption tests were conducted prior to hypothesis testing. The Shapiro-Wilk test was performed to check for data normality, as it is appropriate for sample sizes of less than 50 per group. Subsequently, Levene's test was used to assess the homogeneity of variances between the groups. After confirming that the assumptions were met, the research hypotheses were tested using an Independent Samples t-test. This test was utilized to compare the significance of the difference in gain scores for creative narrative writing and the final post-test scores for multimodal communication competence between the experimental and control groups. The significance level (alpha) for all statistical tests was set at $\alpha = 0.05$.

Results and Discussion

This section presents and discusses the research findings in an integrated manner. The data are organized according to the research objectives, followed by an interpretation of their significance, a comparison with previous studies, and a connection back to the identified research gap and theoretical framework.

Significant Improvement in Creative Narrative Writing Skills

To address the first research objective, the data analysis focused on comparing the improvement in creative narrative writing skills between the experimental and control groups. The presentation of results begins with the descriptive statistics summarized in Table 2.

Table 2. Descriptive Statistics Comparison of Creative Narrative Writing Skills

Group	N	Pretest (Mean \pm SD)	Post-test (Mean \pm SD)	Gain Score (Mean \pm SD)
Experimental	30	63.13 \pm 5.12	84.50 \pm 4.98	21.37 \pm 3.80
Control	30	62.80 \pm 5.34	69.17 \pm 5.01	6.37 \pm 2.45

As shown in Table 2, although both groups started from a similar baseline, the experimental group achieved a notably higher mean post-test score and gain score. To validate this observation, an independent samples t-test was conducted on the gain scores. The analysis yielded a value of $t(58) = 20.45$, with a significance of $p = .000$ ($p < 0.05$). This result indicates that the improvement in narrative writing skills in the experimental group was significantly higher than the improvement in the control group.

This finding strongly suggests that the PjBL-DST model not only serves as a platform for digital practice but also effectively strengthens foundational conventional writing skills. This outcome can be explained through the inherent structure of the PjBL model. The initial project phases, which required students to formulate an "essential question" and design a storyboard, compelled them to engage in a more profound and structured pre-writing process. This finding aligns with research by (Keleman, 2021; Sukacké et al., 2022; Vidergor, 2022; Wu, 2024), who found that PjBL encourages students to engage in higher-order cognitive processes, resulting in more organized work. For instance, a typical pretest script often followed a generic plot about a student's daily routine. In contrast, a post-test script from the experimental group frequently demonstrated greater narrative depth. One student, for example, crafted a modern reinterpretation of the local West Sumatran legend of *Siti Nurbaya*. An excerpt from the script illustrates a marked improvement in diction and imagery: *"The city lights of Padang glittered like scattered diamonds on*

black velvet, but for Siti, they were just cold stars in a cage of tradition she could not escape." This example demonstrates a clear shift from simple description to evocative, creative language, directly reflecting the quantitative gains. Thus, this result directly addresses a part of the identified research gap by providing empirical evidence that the structured process of PjBL is more effective for developing core writing skills than traditional methods.

Superior Development of Multimodal Communication Competence

The second research objective was to analyze the impact of the PjBL-DST model on multimodal communication competence. The comparison was made based on the final post-test scores for this competence, as presented in Table 3.

Table 3. Post-test Score Comparison of Multimodal Communication Competence

Group	N	Mean Score	Standard Deviation (SD)
Experimental	30	85.20	4.88
Control	30	64.77	5.15

The independent samples t-test for these scores resulted in $t(58) = 16.98$, with $p = .000$. This finding indicates a highly significant difference in the mastery of multimodal communication competence, with the experimental group performing far better.

The interpretation of this finding is a primary contribution of this study. The stark difference between the groups suggests that merely assigning a digital product task (as in the control group) is insufficient for building genuine multimodal competence. Students in the control group tended to treat the task as an "essay with pictures and background music," where visual and audio elements served merely as decorative additions. In contrast, students in the experimental group, guided by the PjBL-DST process, demonstrated a deeper understanding of multimodal rhetoric. This difference was observable in the final products. A typical control group project resembled a narrated slideshow. A top-performing experimental group project, however, demonstrated powerful synergy. For example, in a scene depicting the legend of *Malin Kundang*'s mother waiting for her son's return at Air Manis Beach, the student combined a slow zoom on her weathered hands clutching a worn photograph (visual), with the ambient sound of crashing waves and a melancholic *saluang* flute melody (audio). The quiet, trembling voice-over, "*With every wave, I waited for him...*" worked in concert with the other modes to evoke a profound sense of longing that text alone could not achieve. This illustrates a clear transition from simply adding media to a text to composing meaning *through* media. They learned how modes could work in synergy—how an image could convey unstated emotions, how music could set the narrative pace, and how pauses in narration could create suspense.

Theoretically, this finding provides pedagogical validation for the framework proposed by (Kress & Leeuwen, 2006). The students did not just learn the theory of multimodality; they practiced it authentically, transitioning from the role of a "writer" to that of a "meaning-maker." Furthermore, this result extends the previous findings of (Özen & Duran, 2021; Zarifsanaiey et al., 2022) regarding the benefits of DST. This study demonstrates that the effectiveness of DST in building digital literacy is maximized when implemented within a structured PjBL framework that provides guidance, feedback, and opportunities for revision. This finding directly addresses the main research gap by demonstrating that the integration of PjBL and DST is a robust intervention for the holistic development of multimodal competence.

Implications, Limitations, and Future Research Directions

The findings of this study have several important implications. Theoretically, this research strengthens the link between constructivist learning theory (which underpins PjBL) and the social semiotic theory of multimodality, providing empirical validation for their pedagogical synergy. Practically, the PjBL-DST model offers a tested blueprint for educators to modernize their writing curriculum, equipping students with essential 21st-century competencies.

However, the study has several acknowledged limitations. First, the generalizability of the findings is constrained by the sample being drawn from a single institution and study program. Second, the relatively short duration of the intervention may not be sufficient to capture long-term effects. Third, a potential Hawthorne effect—whereby the novelty of the intervention might have motivated the experimental group—cannot be entirely ruled out.

Based on these limitations, future research could be directed toward several areas. Replication studies in different disciplines and institutions are needed to test the model's transferability. A longitudinal study

could track the retention of these acquired skills over time. Finally, future studies could adopt a mixed-methods design, incorporating qualitative interviews to provide deeper insights into the students' cognitive and collaborative processes during the project.

Conclusion

This study set out to analyze the effectiveness of an integrated Project-Based Learning (PjBL) and Digital Storytelling (DST) model in enhancing students' creative narrative writing skills and multimodal communication competence. The findings conclusively demonstrated that the PjBL-DST model was significantly superior to conventional instruction in improving both skill sets. Students engaged in the model not only produced higher-quality narrative scripts but also showed a far greater mastery of integrating text, visual, and audio elements to create coherent and persuasive digital works. The study contributes a tested, adaptable pedagogical model for modernizing writing instruction and provides empirical evidence bridging constructivist learning theory with the social semiotics of multimodality. While significant, the findings are bound by limitations, including a single-institution sample and a relatively short intervention period, which affect generalizability. Future research is therefore encouraged, focusing on replication in diverse contexts, longitudinal studies to assess skill retention, and qualitative inquiries into the student experience. Therefore, future research is highly recommended to replicate this study in more diverse contexts, both in terms of academic discipline and institutional background. Longitudinal studies are also needed to examine the long-term retention of the skills students have acquired. Furthermore, in-depth qualitative research can be conducted to explore the subjective experiences and cognitive processes of students while engaged in the digital storytelling project. Ultimately, this research affirms that the integration of project-based pedagogy with digital literacy is no longer merely an option but an imperative for preparing students to be competent, creative, and relevant communicators in the 21st century.

Declarations

- Author contribution** : **Yulianti Rasyid**: Conceptualization (designing the research idea and framework), Methodology (designing the research design and instruments), Supervision (overseeing the research process), Funding acquisition (if applicable), and Writing – original draft (writing the main parts of the manuscript). **Dadi Satria**: Investigation (carrying out the classroom intervention and data collection), Formal analysis (performing the statistical analysis of the collected data), and Writing – review & editing (providing input and revisions to the draft). **Yeni Hayati**: Data curation (managing and validating the research data), Validation (verifying the analysis results), and Writing – review & editing (conducting a critical review of the manuscript for clarity, accuracy, and completeness of references).
- Funding statement** : This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. This research was conducted as part of the authors' academic responsibilities under the *Tri Dharma Perguruan Tinggi* (the three pillars of Indonesian higher education: education, research, and community service).
- Conflict of interest** : The authors declare that there are no financial or non-financial conflicts of interest that could be perceived to influence the objectivity, interpretation, or presentation of the results reported in this research.
- Ethics Approval** : Written informed consent was obtained from all participants prior to their involvement in the study. The participants were informed about the purpose of the research, the procedures to be followed, the potential benefits and risks, and their right to withdraw at any time without any negative consequences. This research was conducted in compliance with all the ethical principles stipulated by the Research Ethics Committee of Universitas Negeri Padang (KEP-UNP).
- Additional information** : The authors would like to express their sincere gratitude to the Rector of Universitas Negeri Padang and the Dean of the Faculty of Languages and Arts for providing the facilities and support that ensured the smooth execution of this research. Acknowledgements are also extended to the Head of the Indonesian Language and Literature Education Study

Program, as well as to all the students who enthusiastically participated in this study. The research data that support the findings of this study, including anonymized participant scores and analysis protocols, are available from the corresponding author, Yulianti Rasyid, upon reasonable request.

Appendix

Appendix A: Research Instruments (Assessment Rubrics)

The analytic rubric used to assess creative narrative writing skills and multimodal communication competence can be seen in Table 4.

Table 4. Rubric for Assessing Creative Narrative Writing Skills

<i>Assessment Criteria</i>	<i>Score 5 (Excellent)</i>	<i>Score 3 (Adequate)</i>	<i>Score 1 (Needs Improvement)</i>
Plot Development	The plot is highly structured, coherent, and features a clear and engaging exposition, conflict, climax, and resolution.	The plot is generally clear, but some parts feel underdeveloped or less logical.	The plot is unclear, disjointed, and difficult to follow.
Characterization	Characters have depth, clear motivations, and demonstrate consistent and convincing development.	Characters are adequately described but tend to be flat and cliché. Their motivations are not fully explored.	Characters are poorly depicted, one-dimensional, and inconsistent.
Setting Development	The setting (place, time, atmosphere) is described with vivid detail and effectively serves to strengthen the story and mood.	A description of the setting exists but is generic and does not significantly contribute to the story.	The setting is not described, or the description is minimal and irrelevant.
Originality	The story idea is highly original, fresh, and shows a unique perspective from the author.	The story idea is moderately interesting but feels familiar or follows an existing formula.	The story idea is very cliché, uninteresting, and lacks novelty.

Table 5. Rubric for Assessing Multimodal Communication Competence

<i>Assessment Criteria</i>	<i>Score 5 (Excellent)</i>	<i>Score 3 (Adequate)</i>	<i>Score 1 (Needs Improvement)</i>
Synergy between Modes	Text, images, and audio work together synergistically. Each mode reinforces the meaning of the others, creating a unified narrative experience.	There is a connection between the modes, but at times it feels forced, or one mode dominates without clear reason.	Visual and audio elements feel random, do not support the text, or even interfere with the narrative.
Visual Design Quality	The choice of images/videos is highly relevant and of high quality. Composition, color, and typography aesthetically support the story's mood.	Images/videos are fairly relevant, but their quality varies. The visual design is functional but lacks aesthetic value.	Images/videos are irrelevant, of low quality, or their composition hinders readability.
Effectiveness of Audio Use	The voice-over narration is very clear and expressive. Background music and sound effects are used effectively to build emotion and pace the story.	The voice-over is clear enough but monotonous. Background music is present but does not fully integrate with the story's atmosphere.	Audio quality is poor (unclear, excessive noise). Music or sound effects are either absent or used inappropriately.
Digital Flow & Pace	Transitions between scenes are smooth and logical. The pacing of each scene is well-managed, making the story easy to follow and enjoy.	Transitions sometimes feel awkward or are paced too quickly/slowly. The overall plot is still generally followable.	The digital flow is very confusing. Transitions are abrupt, and the pacing is unbalanced, making it difficult to follow.

Appendix B: Participant Consent Form (Informed Consent)

CONSENT FORM FOR PARTICIPATION IN RESEARCH

Study Title: Enhancing Creative Narrative Writing Skills and Multimodal Communication Competence through a Digital Storytelling-Based Project-Based Learning Model

- **Principal Investigator(s):** Yulianti Rasyid, Dadi Satria, and Yeni Hayati
- **Institution:** Indonesian Language and Literature Education Study Program, Universitas Negeri Padang

You are invited to participate in a research study examining the effectiveness of a new learning model in the Creative Writing course.

Procedures: If you agree to participate, you will follow the regular learning activities in this course for a period of 10 weeks. These activities will include in-class instruction, writing assignments, and the creation of a short narrative video project (a digital story). Your coursework and the final project will be analyzed for research purposes.

Benefits and Risks: The direct benefit to you is gaining a learning experience with an innovative pedagogical approach that may enhance your writing and digital skills. There are no foreseeable physical or psychological risks associated with participating in this study.

Confidentiality: All data collected in this study, including your name and your work, will be kept strictly confidential. In any publications resulting from this research, your identity will be anonymized through the use of a code to protect your privacy.

Voluntary Participation: Your participation in this study is completely voluntary. You have the right to refuse to participate or to withdraw at any time during the research process, without any negative consequences for your grade or academic standing.

If you have any further questions regarding this research, please contact the principal investigator, Yulianti Rasyid, via email at yulianti_rasyid@fbs.unp.ac.id or by telephone at 0813-6332-2003.

Statement of Consent

I have read and understood the information provided above. I voluntarily agree to participate in this research study.

Participant Name :

Participant Signature :

Date :

Researcher's Signature:

Date :

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