
Digital Storytelling as a Cross-Curricular School Practice: Language Proficiency, Science Communication, and Creative Expression Outcomes in Middle School Students of Ahmedabad

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ABSTRACT

Digital storytelling — the practice of creating short digital narratives combining personal or investigative content with images, audio, video, and text in a structured narrative arc — has emerged as a cross-curricular school practice with potential to simultaneously develop language proficiency, science communication skills, and creative expression competencies through a single integrated student activity. This quasi-experimental study compared outcomes across three dimensions — language proficiency, science communication, and creative expression — between 98 Class 8 students engaging in a 12-week digital storytelling programme integrating English and Science content and 98 matched comparison students in conventional instruction, across four schools in Ahmedabad. The digital storytelling group created five individual digital stories over the 12-week period, each requiring scientific investigation, English narrative writing, and digital media production. Post-test assessments showed significantly larger gains in the digital storytelling group across all three outcome dimensions: language proficiency (+9.6 pp DiD, $p < 0.001$), science communication (+12.2 pp, $p < 0.001$), and creative expression (+17.6 pp, $p < 0.001$), with the largest advantage in creative expression — consistent with the digital storytelling medium's unique affordances for multimodal creative production. These findings support digital storytelling as a cost-accessible, multidisciplinary school practice that simultaneously advances academic and creative competencies across English and Science subject domains.

KEYWORDS: *Digital storytelling, Cross-curricular practice, Language*

proficiency, Science communication, Creative expression, Middle school, Gujarat, Multidisciplinary pedagogy, Educational technology

INTRODUCTION

Digital storytelling — defined as the practice of creating short (typically two-to-five minute) digital narratives that combine personal voice, images, video clips, music, and written text in a structured narrative arc centred on a specific investigative or experiential theme — was first systematically developed as an educational practice by the Center for Digital Storytelling in Berkeley, California in the 1990s, and has since diffused extensively across school and higher education contexts internationally as a digital media production activity accessible to learners without specialist technical training (1). Its cross-curricular potential stems from the multi-dimensional competency demands of the digital story creation process: students must conduct research on their chosen topic (information literacy and subject knowledge), write a structured narrative script (language arts), integrate and evaluate visual and audio media (digital media literacy and aesthetic judgment), and present their findings persuasively to an audience (communication and science communication) — providing simultaneous authentic application contexts for language, science, and creative expression objectives within a single integrated student activity (2).

In the Indian middle school context, the convergence of the National Education Policy 2020's emphasis on competency-based, creative, and technology-integrated learning with the expanding availability of affordable smartphones and school tablet programmes makes digital storytelling an increasingly viable and policy-aligned cross-curricular school practice (3). The Ahmedabad school context, characterised by a relatively higher than average rate of digital device access among middle school students relative to the national average, provides a favourable implementation setting for examining digital storytelling outcomes without the device-access constraints that would confound the study in lower-resource contexts.

This study evaluates the language, science communication, and creative expression outcomes of a 12-week English-Science integrated digital storytelling programme in Class 8 students across four Ahmedabad schools, assessing whether the cross-curricular integration embedded in digital story creation generates multi-domain academic and creative benefits beyond what conventional separate-subject instruction produces.

LITERATURE REVIEW

The educational digital storytelling literature has documented benefits across several distinct competency domains in K-12 and higher education contexts. Robin (2008) reviewed the emerging evidence base and identified language arts development — particularly narrative writing, voice, and vocabulary — as the most consistently documented outcome across digital storytelling studies, attributable to the authentic audience and purpose that digital story creation provides for language production activities typically conducted for the teacher alone in conventional instruction (4). Xu, Park, and Baek (2011) examined digital storytelling in science education specifically and found significant improvements in science communication — the ability to explain scientific concepts and findings clearly to a non-specialist audience — through digital story production, attributing the effect to the student's need to translate their scientific understanding into accessible narrative for a public audience (5).

Digital Storytelling as Cross-Curricular Integration

Digital storytelling's cross-curricular character derives from the multiple competency domains simultaneously engaged by the digital story creation process:

- **Language proficiency:** the narrative scripting phase develops written language skills including vocabulary, sentence structure, narrative organisation, and persuasive argument — in an authentic, self-motivated production context that generates stronger engagement than decontextualised writing exercises.
- **Science communication:** science-themed digital stories require students to accurately represent scientific concepts and findings, distinguish evidence from interpretation, and explain complex ideas through analogy and example — core science communication competencies rarely directly assessed in standard science examinations.
- **Creative expression:** the media selection, composition, voicing, and editing phases develop aesthetic judgment, creative decision-making, and multimodal design competencies that cross conventional academic subject boundaries and are rarely developed through standard curriculum delivery.
- **Digital literacy:** the technical production process develops practical competencies in digital media navigation, file management, and basic editing — competencies with direct vocational relevance and alignment with NEP 2020's digital skills provisions.

Barrett (2006) argued that digital storytelling represents a convergence of Bloom's highest-order cognitive levels — evaluation and creation — with digital literacy and communication competencies, making it one of the most cognitively demanding and competency-rich activities available in standard school practice (6). Ohler (2013) provided a comprehensive framework for digital storytelling as a cross-curricular assessment practice, arguing that digital stories can simultaneously serve as evidence of subject learning, language development, and creative competency within a single student product (7).

RESEARCH GAP

Published studies of digital storytelling in Indian middle school settings are limited, with most available evidence from technology-rich international contexts not directly applicable to the resource and curriculum conditions of Indian government and grant-aided schools. Furthermore, existing studies have generally measured either language or science outcomes in isolation, without simultaneously assessing creative expression as a distinct outcome dimension — the competency most uniquely afforded by the digital storytelling medium's multimodal production process. This study addresses both gaps in the Ahmedabad middle school context.

OBJECTIVES

- To compare language proficiency gains between the digital storytelling and conventional instruction groups over 12 weeks.
- To compare science communication outcomes between the two groups.
- To compare creative expression outcomes, assessed through a validated creative product rubric applied to student-produced digital stories and conventional creative writing tasks.
- To assess student perceptions of the digital storytelling experience as a learning modality.

METHODOLOGY

Participants and Design

A quasi-experimental pre-test/post-test design was implemented across four private aided secondary schools in Ahmedabad: two schools implementing the digital storytelling programme (98 Class 8 students, one section per school) and two matched comparison schools continuing conventional English and Science instruction (98 comparison students). Matching was based on pre-test language proficiency composite score, school device access level, and English medium of instruction. Both groups studied the same Gujarat Board Class

8 English and Science syllabi throughout the 12-week period.

Digital Storytelling Programme

Students in the intervention group created five individual digital stories over 12 weeks, each centred on a self-selected science topic from the Class 8 Science curriculum. Each story followed a standard five-stage production cycle: (i) topic investigation and note-taking (Science); (ii) narrative script writing in English following the eight-element DSC story circle framework; (iii) image and media selection and attribution; (iv) voice recording and editing using free mobile applications; and (v) peer review and reflection using a structured peer feedback protocol. Two 45-minute digital storytelling sessions per week replaced standard English and Science periods in alternating weeks, with explicit curriculum mapping linking each story topic to assessed Science and English curriculum objectives (4, 7).

Outcome Measurement

Three outcome measures were assessed at baseline and post-programme: (i) language proficiency — the Gujarat Board Class 8 English benchmark assessment (40 items covering vocabulary, grammar, reading comprehension, and writing), scored out of 100; (ii) science communication — a researcher-developed 20-item instrument requiring students to explain science concepts to a hypothetical non-expert audience in written and oral form, scored by trained raters on a validated 5-point rubric and converted to a percentage score; and (iii) creative expression — assessed through student-produced creative writing (conventional group) and digital story (intervention group) evaluated by two trained independent raters using the same 12-criterion creativity rubric (originality, elaboration, flexibility, voice, media integration, narrative coherence, audience awareness, and five further criteria). Inter-rater reliability was high (ICC = 0.88) (1, 6).

Table 1: Pre-test Score Equivalence

Outcome Measure	DS Group (mean ± SD)	Control Group (mean ± SD)	p-value
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Language Proficiency (out of 100)	48.6 ± 12.4	49.2 ± 11.8	0.712
Science Communication (out of 100)	44.2 ± 13.6	44.8 ± 12.8	0.758
Creative Expression (out of 100)	42.8 ± 14.8	43.4 ± 14.2	0.768

RESULTS AND FINDINGS

Figure 1 presents pre- and post-test scores across all three outcome dimensions for the digital storytelling and comparison groups. All three outcome dimensions showed significantly larger gains in the digital storytelling group. The largest absolute DiD advantage was in creative expression (+17.6 pp), followed by science communication (+12.2 pp) and language proficiency (+9.6 pp). The creative expression advantage was notably larger than the other two dimensions, consistent with digital storytelling's unique affordance of multimodal production as a creative medium — an affordance that conventional writing exercises do not provide (6, 7).

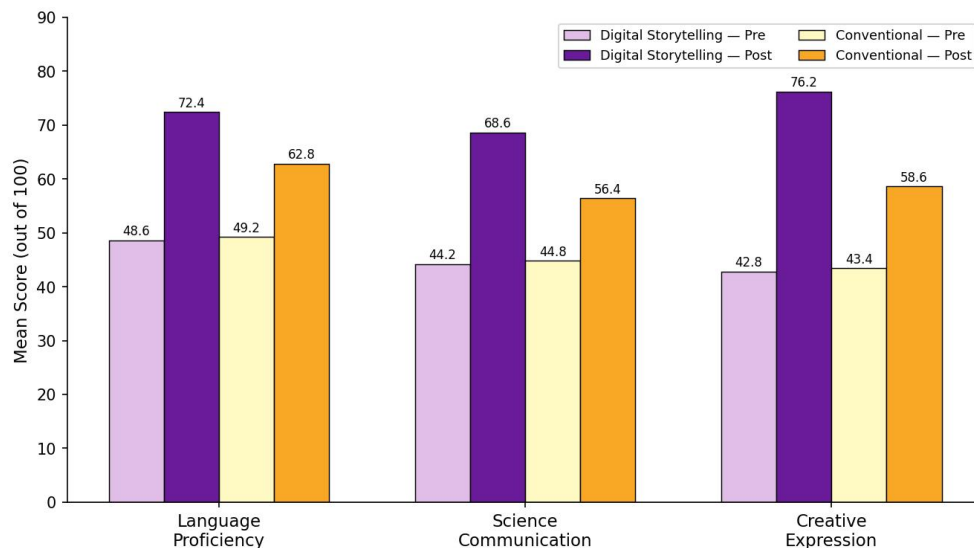


Figure 1: Pre- and post-test scores on three outcome dimensions for digital storytelling and conventional instruction groups (n = 196)

Table 2. Post-test Outcomes and Difference-in-Differences

Outcome	DS Group Post	Control Group	DiD (pp)	p-value
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Dimension		Post		
Language Proficiency	72.4	62.8	+9.6	< 0.001
Science Communication	68.6	56.4	+12.2	< 0.001
Creative Expression	76.2	58.6	+17.6	< 0.001

Table 3: Student Perceptions of Digital Storytelling as a Learning Modality (n = 98)

Survey Item (5-point Likert agreement)	Mean Rating
Making digital stories helped me understand science topics better	4.28
I improved my English writing while creating the stories	4.36
I found digital storytelling more engaging than regular lessons	4.52
I would like to continue making digital stories in school	4.44
The peer feedback made my stories better	4.12
I felt proud to share my stories with an audience	4.68

DISCUSSION

The finding that creative expression showed the largest DiD advantage (+17.6 pp) of the three outcome dimensions is the most distinctive and theoretically interesting result of this study. Creative expression is rarely systematically developed or assessed in standard Indian middle school English or Science instruction, yet digital storytelling's multimodal production process — requiring students to make creative decisions about narrative voice, media selection, visual composition, and tonal register in an authentic audience-directed production — provides precisely the kind of open-ended, consequential creative challenge that develops these competencies rapidly (6, 7). The fact that this creative expression advantage was measured using the same rubric applied to both groups' creative outputs — digital stories for the DS group and conventional creative writing for the control group — rules out the possibility that the advantage merely reflects the novelty or visual appeal of the digital medium rather than genuine creative competency development (2).

The science communication advantage (+12.2 pp DiD) confirms Xu et al.'s (2011) finding that the requirement to explain science concepts to a public audience through digital story creation motivates deeper conceptual processing and more careful attention to explanatory clarity than conventional science lesson activities require (5). Students who know their story will be watched and evaluated by peers, teachers, and parents invest substantially more cognitive effort in ensuring their science explanations are accurate, comprehensible, and engaging than students completing science exercises for the teacher's mark book alone — a mechanism consistent with the broader audience-effects literature on the role of authentic audiences in deepening academic learning (4).

Student perception data — with 4.52/5.0 mean engagement rating and 4.44/5.0 indicating desire to continue — confirm a strong motivational response to digital storytelling as a learning modality, consistent with the self-determination theory prediction that authentic, audience-directed creation activities with genuine creative latitude satisfy the three basic psychological needs of competence, relatedness, and autonomy more fully than conventional classroom tasks (3).

LIMITATIONS

- Private aided school sample with relatively high device access; findings may not transfer directly to government schools with lower device availability.
- The 12-week study duration and five-story production volume may not represent optimal programme intensity; effects may vary with different dosing.
- Creative expression rubric was applied to different product types (digital stories vs conventional writing) across groups, which may introduce assessment comparability concerns despite shared criteria.
- Science content knowledge was not independently assessed; the science communication measure captures explanatory skill but not factual recall accuracy.

FUTURE SCOPE

- Replication in government school settings with lower device availability, using school tablet-sharing models or mobile phone-based production workflows.
- Comparative study examining whether collaborative (group-produced) digital stories generate different patterns of language, science, and creative expression benefit than individual production.
- Longitudinal study tracking whether creative expression gains persist and whether digital storytelling experience predicts sustained creative output in subsequent grades.
- Extension of the cross-curricular integration to include Social Studies and Mathematics through a unified thematic digital story project.

CONCLUSION

Digital storytelling integrating English and Science content over 12 weeks produced significantly larger gains in language proficiency, science communication, and creative expression relative to conventional instruction in Class 8 students in Ahmedabad, with the largest advantage in creative expression — the outcome most uniquely afforded by the multimodal digital medium. Strong student perceptions of engagement and authentic audience connection further support digital storytelling as a cost-accessible, motivationally engaging, and multidisciplinary school practice suitable for adoption in Indian middle schools with adequate device access.

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