



Exploring design thinking principles in a digital storytelling for young learners course

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ABSTRACT

This study explored how pre-service English teachers applied Design Thinking (DT) for Curriculum Design while developing digital stories in a Digital Storytelling for Young Learners course. Using a qualitative case study design, data from two pairs of pre-service teachers, including digital storytelling artifacts, learning objectives, reflection essays, observation sheets, and interviews, were analyzed through an iterative coding process guided by DT's five stages. Findings show the stages did not unfold in a fixed order. Empathy toward learners continued to develop into the test stage, as both pairs only discovered that their materials mismatched older learners' engagement once piloted. The define stage functioned to translate national Learning Outcomes for Phase B into classroom-ready objectives rather than to define open-ended problems. Prototyping raised two considerations underaddressed in prior DT literature: ethical AI image use and intentional, diverse character representation. Feedback during testing followed different paths by source: lecturer and peer feedback reshaped the artifact itself, while young learners' feedback mainly reshaped in-the-moment delivery. These findings suggest DT does not guarantee deep creative iteration, but helps pre-service teachers translate a fixed curriculum through a reflective process, contributing to discussions on DT and teacher education in TEYL contexts.

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ABSTRAK

Penelitian ini mengeksplorasi bagaimana calon guru bahasa Inggris menerapkan Design Thinking for Curriculum Design (DT) dalam pembuatan cerita digital pada mata kuliah Digital Storytelling for Young Learners. Menggunakan desain studi kasus kualitatif, data dari dua pasang calon guru, artefak digital storytelling, tujuan pembelajaran, esai refleksi, lembar observasi, dan wawancara dianalisis melalui proses coding iteratif yang berpedoman pada lima tahap DT. Temuan menunjukkan tahapan tersebut tidak berlangsung berurutan tetap: empati terhadap peserta didik terus berkembang hingga tahap tes, karena kedua pasangan baru menyadari materi mereka tidak sesuai dengan keterlibatan peserta didik yang lebih tua setelah diujicobakan. Tahap define berfungsi sebagai penerjemahan Capaian Pembelajaran Fase B menjadi tujuan pembelajaran siap pakai, bukan sebagai proses mendefinisikan masalah secara terbuka. Tahap prototipe memunculkan dua pertimbangan yang belum banyak dibahas dalam literatur DT, yaitu penggunaan gambar AI secara etis dan representasi karakter yang beragam. Umpan balik selama tahap tes mengikuti jalur berbeda tergantung sumbernya: umpan balik dosen dan rekan sejawat membentuk ulang artefaknya, sementara umpan balik pelajar muda membentuk ulang cara penyampaian cerita. Temuan menunjukkan bahwa DT tidak menjamin iterasi kreatif yang mendalam, namun membantu calon guru menerjemahkan kurikulum melalui proses reflektif, serta berkontribusi pada diskusi Design Thinking dan pendidikan guru dalam konteks TEYL.

Kata Kunci: calon guru; desain kurikulum; design thinking; digital storytelling; pengajaran bahasa Inggris untuk anak

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INTRODUCTION

Digital technologies in English language education have grown to support meaningful learning, particularly in Teaching English to Young Learners (TEYL) contexts. Digital Storytelling (DST) has attracted interest for its ability to merge narrative, audio, visual, and interactive elements into a multimodal learning experience that supports children's curiosity-driven understanding (Chang & Suh, 2025; Kasemsarn & Nickpour, 2025; Purnama et al., 2022). Informative digital stories are especially relevant in educational settings, supporting learning objectives and knowledge construction (Çetin, 2021), while building pre-service teachers' technological, pedagogical, and creative skills (Shinas & Wen, 2022).

Alongside this growing use of DST, Design Thinking (DT) has gained recognition as a human-centered, iterative educational design model comprising five flexible stages: Empathize, Define, Ideate, Prototype, and Test, whose stages let designers revisit earlier ones as new insights emerge (Henriksen et al., 2018). In education, DT encourages teachers to move beyond content delivery toward designing learning experiences that address students' needs (Baltador et al., 2024). As creativity, collaboration, and empathy become increasingly important for navigating rapid technological and occupational change (Thornhill-Miller et al., 2023), DT offers a relevant framework for teacher education, positioning pre-service teachers as designers who can transform DST from a technical exercise into a meaningful learning experience.

Previous studies on DST have mainly focused on students' motivation, language development, engagement, and perceptions toward DST activities (Ginting et al., 2024; Hadj, 2024; Temel & Yilmaz, 2025). Other studies have explored pre-service teachers' experiences creating digital stories and the tools they use, such as Powtoon, GoAnimate, and Animatron (Çetin, 2021). More recently, the process of constructing a digital story, particularly its planning, decision-making, and problem-solving demands, has been linked to the development of pre-service teachers' critical thinking (Isaacs et al., 2024). Although DST in education has received considerable attention, research has largely overlooked the instructional design process underlying its development, and little is known about how pre-service teachers apply DT principles, particularly its iterative stages, when developing digital storytelling artifacts in TEYL courses.

Therefore, this study aims to explore how pre-service teachers applied DT principles while developing digital storytelling artifacts in a Digital Storytelling for Young Learners course. Specifically, this study seeks to answer the following research questions: (1) How were the stages of Design Thinking reflected in participants' design processes and decision-making throughout the development of their digital story? (2) How did integrating Design Thinking principles enhance the design process and the resulting digital story in relation to the intended learning outcomes for young learners? In doing so, the study contributes to the growing discourse on DT, DST, and teacher education in TEYL contexts.

LITERATURE REVIEW

Design Thinking in Curriculum Design

Curriculum design in language education involves systematic planning across interconnected processes: needs analysis, formulation of learning objectives, selection of materials and methods, and evaluation, to ensure overall alignment (Irfadila, 2025; Nigie & Ahid, 2023). Design Thinking (DT) has also been positioned as an alternative to linear instructional design models such as ADDIE (Analysis, Design, Development, Implementation, Evaluation), which follows a step-by-step approach and can be too rigid for situations requiring ongoing, feedback-based adjustment (Shé et al., 2021). DT instead treats each stage as revisable, letting designers test and revise decisions based on real learner contact rather than a fixed sequence, and has increasingly been adopted in education as a human-centered, iterative approach emphasizing empathy, creativity, collaboration, experimentation, and reflection (Li & Zan, 2022; Rösch et al., 2023; Sreenivasan & Suresh, 2024).

In practice, curriculum design decisions are also often reached jointly, with teachers negotiating and combining ideas as part of a shared, ongoing design activity (Wu et al., 2022). The application of Design Thinking in curriculum design, rather than in the realm of business or products, is clearly depicted by Crites & Rye (2020) based on the Design Thinking framework. Through a case study of language curriculum reform at a Colombian university, they show how the five DT stages, from understanding learners' needs in Empathize to reflection and evaluation in Test, map onto concrete curriculum design activities in an iterative, student-centered process.

The presented case study on course design demonstrates the participatory use of Design Thinking, in which students are directly involved in determining assignment topics, learning objectives, and assessment designs, thereby reinforcing curriculum design as a collaborative process rather than one determined entirely by the instructor (Rutherford, 2020). The stages of DT align with key principles of curriculum design in language education: Empathize reflects needs analysis, Define corresponds to formulation of learning objectives, Ideate relates to selection of materials and instructional methods, Prototype represents development of learning products, and Test corresponds to evaluation and reflection, extending traditional curriculum design into a more iterative, collaborative, student-centered process.

In teacher education contexts, DT for Curriculum Design is particularly relevant because it positions pre-service teachers as active designers rather than passive implementers, especially in courses that emphasize project-based and multimodal learning approaches, such as digital storytelling. The growing use of generative AI tools in instructional material development has also introduced new ethical considerations into prototyping. Recent reviews note that ethical judgment tends to be worked out on a case-by-case basis, particularly regarding authorship, appropriateness, and context of use (García-López & Trujillo-Liñán, 2025). For pre-service teachers designing multimodal materials, prototype-stage decisions increasingly involve weighing not only pedagogical and technical considerations but also whether a tool suits a specific, non-commercial, educational purpose.

Teaching English to Young Learners

Teaching English to Young Learners (TEYL) emphasizes the importance of meaningful, engaging, and developmentally appropriate learning experiences (Romadhon et al., 2024). Young learners tend to learn effectively through concrete experiences, visual support, interaction, repetition, movement, and play rather than abstract linguistic explanations (Astuti & Hasibuan, 2025). Therefore, instructional design for young learners requires careful consideration of students' cognitive, emotional, and social characteristics (Rahman et al., 2025). According to Cameron (2001) in *"Teaching languages to young learners,"* storytelling has long been recognized as an effective pedagogical approach for young learners because stories provide meaningful contexts for language exposure and communication, supporting imagination, motivation, and emotional engagement.

DST has increasingly been integrated into TEYL contexts because it combines narrative, images, audio, animation, and visual elements that can enhance young learners' attention and comprehension (Chang & Suh, 2025; Kasemsarn & Nickpour, 2025; Purnama et al., 2022). DST in TEYL contexts should be designed to align with students' developmental levels and instructional objectives, generally using simple language, clear narrative structures, age-appropriate vocabulary, visual supports, and multimodal elements that facilitate comprehension and engagement (Robin, 2008). Feedback timing also matters for how digital storytelling artifacts are refined. Research on DST created by teacher candidates suggests that feedback received before implementation is more useful for revising the product itself, while feedback collected after delivery, though valuable for reflection, often comes too late to shape a revised version within a single-iteration course (Shinas & Wen, 2022).

Within the Indonesian educational context, English learning for young learners is guided by the "Panduan Mata Pelajaran Bahasa Inggris", the national guideline released by Kementerian Pendidikan Dasar dan Menengah, which outlines the expected Learning Outcomes for each phase. For Phase B, covering upper elementary students, the guideline states that students should understand and respond to simple oral or multimodal texts about everyday life, understand simple written or multimodal texts about everyday life, and communicate their own ideas on everyday life topics through simple written or multimodal texts, grouped into listening-speaking, reading-viewing, and writing-presenting pairs meant to be developed together. This guideline is directly relevant here, as the pre-service teachers designed digital storytelling artifacts specifically for Phase B students, whose outcomes align closely with the multimodal, everyday-life nature of digital storytelling, a point elaborated further below.

For pre-service teachers, designing digital storytelling artifacts for young learners requires not only technological skills but also pedagogical considerations regarding language appropriateness, instructional objectives, learner engagement, and multimodal communication. Beyond language appropriateness, the design of such materials also raises questions of representation: research on children's literature shows that intentional representation of ethnicity and disability remains uneven, with disability in particular still underrepresented compared to other forms of diversity (Koss, 2015). Where disability is represented, scholars call for strength-based portrayals that position characters with disabilities as capable participants rather than as objects of pity or inspiration (Hayden & Prince, 2023), suggesting representation is both an ethical and a pedagogical consideration.

The Relation between Design Thinking for Curriculum Design and Teaching English to Young Learners

The principles of Design Thinking for Curriculum Design conceptually align with the pedagogical characteristics of TEYL. Both approaches emphasize learner-centered instruction, contextualized learning experiences, creativity, interaction, and meaningful engagement. While DT for Curriculum Design focuses on iterative and empathetic instructional planning, TEYL emphasizes developmentally appropriate experiences responding to learners' cognitive, emotional, and social needs. Empathize in DT corresponds to understanding young learners' characteristics, interests, developmental needs, and learning preferences; Define corresponds to formulating age-appropriate learning objectives and identifying suitable language learning goals; Ideate corresponds to designing interactive and multimodal learning activities involving stories, visuals, songs, movement, and play; prototype corresponds to developing digital storytelling artifacts and instructional materials appropriate for young learners; and Test corresponds to reflecting on instructional effectiveness through feedback, evaluation, and revision of learning activities (synthesized from Cameron (2001) in "*Teaching languages to young learners*") (Henriksen et al., 2018; Robin, 2008).

That alignment shows how the DT stages and TEYL principles together can support more responsive and engaging instructional practices. Beyond these alignments, several stages connect more specifically to the Learning Outcomes for Phase B. Define and Ideate anchor directly to this document, which expects students to understand and communicate about everyday life through simple oral, written, or multimodal texts, pushing instructional planning toward creative, flexible designs that still stay within what Phase B requires. Prototype connects to this same outcome through the digital storytelling artifact itself: since digital stories are multimodal texts combining narration, image, and sometimes sound (Robin, 2008), producing one requires pre-service teachers to translate both pedagogy and curriculum expectations into a concrete product that meets Phase B's expectation for students to respond to multimodal texts. Together, these alignments show that DT for Curriculum Design and TEYL share an iterative, learner-responsive orientation, one that in this course was also shaped directly by a fixed national curriculum document.

METHODS

This study employed a qualitative case study design to examine how Design Thinking for Curriculum Design was reflected in a Digital Storytelling for Young Learners course, focusing on an in-depth analysis of two pairs of pre-service teachers, triangulated across multiple data sources. The study was conducted in the English Language Education program at a university in Indonesia, during the implementation of the Digital Storytelling for Young Learners course. Participants were selected using convenience sampling, based on their visibility and accessibility to the researcher. Two pairs of pre-service English teachers enrolled in the Digital Storytelling for Young Learners course were identified, both of whom had completed digital storytelling artifacts for Phase B learners of the national curriculum.

The participants were recruited after the course ended; hence, there was no potential bias and no impact on their academic performance. Code pairs and numbers identify individual

participants throughout the Results and Discussion: S1 and S2 for Pair 1, S3 and S4 for Pair 2. Interview questions were adapted from the DT framework and validated through expert review. A preliminary interview was conducted with each pair via WhatsApp messaging to share the research purpose and gauge their willingness and suitability, with informal consent obtained through this messaging. Once participants agreed, formal written informed consent was obtained before a 30-minute semi-structured interview was conducted via Zoom, during which they were asked to share their design decisions and reflections. A follow-up interview was later conducted asynchronously via WhatsApp as a member-checking strategy to verify interpretations and clarify ambiguous points.

Both interviews were conducted in Bahasa Indonesia to avoid proficiency-related constraints, and excerpts presented in this article were translated to English. Finally, supporting documents were collected: digital storytelling artifacts (the completed digital stories produced by each pair), learning objectives (the objectives document formulated for each artifact), reflection essays (participants' written reflections on their design process), and observation sheets (completed by participants during classroom piloting sessions). Data analysis followed an iterative coding process, beginning with repeated reading to build familiarity with the data. Coding was conducted at the sentence level, with sentences carrying multiple meanings assigned multiple codes through simultaneous coding.

Codes were grouped into broader categories and organized around the five DT stages: Empathize, Define, Ideate, Prototype, and Test (Henriksen et al., 2018). Themes were then developed by identifying patterns across categories and data sources. Themes specific to each DT stage (**Table 1**) were used to answer the first research question, while patterns appearing across multiple stages, such as feedback and alignment with curriculum outcomes, were used to answer the second. All artifacts were accessed and analyzed only after informed consent, all data were anonymized in line with established ethical guidelines, and data were stored securely. Reflexivity was maintained through the iterative coding process and a member-checking interview, with credibility further strengthened through triangulation across interviews, observation sheets, reflection essays, digital storytelling artifacts, and learning objectives.

RESULTS AND DISCUSSION

This study examined how the five stages of Design Thinking: Empathize, Define, Ideate, Prototype, and Test were reflected in participants' design decisions and how integrating these stages enhanced the design process and its products.

Empathize

Both pairs entered the Empathize stage within parameters the lecturer had already set, such as grade level, rather than through an entirely independent needs analysis,

"The lecturer actually told us which grade level to choose. We agreed on grade 3 elementary school," (Interview, Pair 1 S1).

Within these parameters, participants still built a clearer picture of learners' age, interests, and language proficiency; Pair 1 chose a cartoon-style visual approach because,

"the children we were targeting were still very young," (Interview, Pair 1 S1)

While Pair 2 grounded language choices in measurable readability, checking vocabulary and sentences against Flesch-Kincaid grade levels ranging from 2.11 to 4.09 (Learning Objectives, Pair 2). Needs assessment also reached into contextual relevance. Both pairs picked topics tied to students' daily life, household chores for Pair 1 and exploring rooms of a house for Pair 2, described as intentional because,

"It relates to children's daily lives. Usually at home they get asked to help by their parents," (Interview, Pair 1 S2)

Pair 2 additionally checked the school's textbook curriculum before deciding on a topic (Interview, Pair 2). One finding became visible only after both pairs tested their materials with real students: engagement levels differed across grades even though the materials remained the same, with third graders staying attentive while fourth graders grew bored more quickly (Interview, Pair 1 S1; Reflection Essay, Pair 1 S1). This indicates that the stage continued to develop well into the testing phase, a pattern discussed further below.

Define

The Define stage produced a notable number of coded instances, as both pairs formulated measurable learning objectives, such as,

"Students are able to identify the names of the household activities with at least 80% accuracy," (Learning Objectives, Pair 1)

Pairing a receptive skill with a productive one and anchoring both to the same target language feature, simple present tense. Problem framing was also evident, as one participant traced their theme choice directly to a specific language difficulty from their own experience,

"I thought of this theme because when I was in elementary school, I struggled to distinguish 'bathroom' from 'bedroom.' So, by creating an engaging digital story matched to the right level of language difficulty, that problem could be addressed," (Interview, Pair 2 S3).

These objectives were negotiated jointly rather than written by a single person. Pair 2 described genuinely combining ideas instead of choosing between them,

"We combined two ideas. It wasn't about choosing between my idea or my partner's idea," (Interview, Pair 2 S3)

While Pair 1 said their objectives were *"developed little by little"* through repeated consultation with the lecturer (Interview, Pair 1 S1), and Pair 2 tied theirs directly to the Learning Outcomes for Phase B (Learning Objectives, Pair 2). Prior informal teaching experience also shaped expectations, as one participant had to adjust lessons learned from helping a relative teach kindergarten students to fit older, elementary-aged learners (Interview, Pair 1 S2).

Ideate

Story Concept Generation was a common category in this stage. Both pairs built their story around an everyday conflict familiar to young learners, a child struggling with household

chores for Pair 1 and a family exploring the rooms of a house they just moved into for Pair 2, and both added an element meant specifically to hold learners' attention. Pair 1 gave everyday objects the ability to come alive and narrate their own function, explaining that,

"the magical element was chosen deliberately to make the child feel more involved in the story," (Interview, Pair 1 S1)

Pair 2 built their story around a hide-and-seek mystery leading to a hidden storage room, revealed through a door that opens gradually over several slides before the final reveal (Digital Story, Pair 2). A source of ideas that emerged naturally from the data, though not part of the original codebook, was the influence of earlier cohorts' work. Pair 2 said seeing previous students' digital storytelling artifacts, especially how those projects highlighted diversity, directly shaped their own character design before Prototyping began, explaining they were,

"Motivated by wanting to show children that people are diverse," (Interview, Pair 2 S3)

This shows ideation was informed not only by the pairs' own empathy data and learning objectives, but also by models of earlier work circulating within the cohort. Instructional ideation and engagement strategy were closely tied together at this stage, with both pairs planning hands-on activities, a silhouette guessing game for Pair 1 and a room-matching worksheet for Pair 2, alongside the story concept itself rather than as a separate decision.

Prototype

Both pairs followed the same workflow, writing the storyline and dialogue first before creating visual material:

"Before prompting, we wrote the storyline first, then prompted it to AI" (Interview, Pair 1 S1)

Pair 2 similarly drafted on Google Docs and sketched storyboard thumbnails before finalizing visuals (Interview, Pair 2 S3). This suggests that narrative and pedagogical structure remained the main anchor, with AI tools and visual production entering only at a later step. Repetitive language was also built directly into the narrative structure, most visible in Pair 1's repeated verb action patterns tied to each household object (*"Sweep, sweep, sweep. Goodbye dust!"*) and Pair 2's repeated negation pattern across rooms while searching for a missing character (*"Mei is not in the living room/garage/bathroom"*).

Both pairs treated visual choices such as typography, color, and layout as pedagogical rather than purely aesthetic decisions, such as Pair 1's use of a large, high-contrast font for young readers. Although not the single largest category by instance count, the most consistent and cross-validated finding across the whole Prototype stage was intentional, diverse character representation. Pair 2's five main characters were deliberately designed to reflect different ethnic backgrounds and included one character who uses a wheelchair, a conscious representational choice the participants described rather than a small detail:

"We tried to include many ethnicities; there's also one with disability, one who uses a wheelchair" (Interview, Pair 2 S4).

This finding appeared consistently across three data sources: the digital story, the interview, and the learning objectives document, making it one of the most well-supported findings in

this dataset. Technical production also raised an unexpected ethical issue: the use of AI-generated images. One participant departed from the usual practice of avoiding such images, reasoning it was acceptable given the material would not be sold commercially (Reflection Essay, Pair 2 S4). Although it appears only once, this shows participants actively weighing the tool's appropriateness for this non-commercial educational purpose.

Test

The test stage produced the highest number of coded instances, as both pairs piloted their digital stories directly with real young learners rather than a smaller trial audience first. Feedback during this stage came from three sources: the course lecturer, peers, and the young learners themselves, each leading to a different kind of revision. Feedback from the lecturer tended to trigger early structural revisions, before classroom testing. Pair 1 changed their entire visual approach after the lecturer questioned why their first draft had no relatable child characters at all:

"When we presented the initial draft, the lecturer asked why there were no characters. It had to be child characters" (Interview, Pair 1 S1).

Peer feedback reached participants through informal observation of classmates' projects and direct comments; Pair 2 revised the focus of their storyline after noticing a classmate's project had a clearer learning objective built into the narrative (Interview, Pair 2 S3, S4). Feedback from young learners was mostly collected through the course's observation sheets, mainly shaping real-time delivery rather than the artifact's design. Participants reported adding questions or small games on the spot when they noticed students losing interest (Reflection Essay, Pair 1 S1; Observation Sheet, Pair 2 S3).

Alongside this learner feedback, self-reflection was also common and not always positive. One participant felt less satisfied with the final story than an earlier, more creative draft, attributing the change to time pressure (Interview, Pair 1 S1). Lessons learned mostly centered on classroom management and on how well worksheets matched students' actual ability, with several participants noting that their materials were pitched too low (Reflection Essay, Pair 2 S3; Observation Sheet, Pair 2 S3, S4).

Table 1. Summary of Categories Across the Five Design Thinking Stages

DT Stage	Category	Instances	Description
Empathize	Learner Profiling	12	Awareness of learners' age and language level
Empathize	Needs Assessment	13	Connecting content to daily life and curriculum
Define	Objective Formulation	19	Measurable objectives anchored to curriculum and lecturer input
Define	Problem Framing	4	Identification of a specific language difficulty the objective addresses
Define	Collaborative Decision	3	Joint decision-making between pair members and lecturer
Ideate	Story Concept Generation	14	Relatable themes combined with fantasy elements for engagement
Ideate	Instructional Ideation	7	Planning hands-on and multimodal activities

DT Stage	Category	Instances	Description
Ideate	Engagement Strategy	7	Engagement strategies as a consistent design consideration
Prototype	Story Structure	12	Storyboard first workflow with systematic repetition
Prototype	Visual Design	9	Deliberate, consistent, and inclusive visual representation
Prototype	Technical Production	6	Tool choice and ethical reflection on AI use
Test	Self Reflection	36	Retrospective evaluation of process and product
Test	Revision Process	5	Revise the content and design based on the evaluation
Test	Receiving Feedback	24	Several feedback loops from lecturer, peers, and learners
Test	Engagement Strategy	12	Real-time adjustment during classroom delivery

Source: Researcher's coding analysis, 2026

Across the five stages, both pairs followed a strikingly similar path despite designing independently, shaped more by course parameters (lecturer input, curriculum outcomes, real classroom piloting) than by individual preference, a consistency (summarized in **Table 1**) suggesting the course structure, more than either pair's creative choices, drove how DT for Curriculum Design unfolded here.

Discussion

The findings above show that Design Thinking (DT) for Curriculum Design did more than give participants new vocabulary for a process they already engaged in naturally. It visibly shaped how the two pairs approached curriculum-embedded storytelling design, supporting and extending earlier work on DT in teacher preparation. These stages do not proceed linearly, and feedback crosses the boundaries between stages. The process is cyclical rather than sequential, with its stages designed to be revisited rather than completed in a single pass, in line with the principles of the Design Thinking framework in general (Crites & Rye, 2020; Henriksen et al., 2018). Empathy-related insight continued to build well into the test stage, since both pairs only discovered that their material did not fit older learners' engagement level once it was tested in a real classroom.

The engagement strategy emerges on two occasions: as a planning decision during the ideation stage and as an improvisational adjustment during the testing stage. This reflects the flexibility of the Design Thinking framework, which allows designers to revisit earlier stages and to position classroom implementation as a source of empathy data rather than merely the final step of the process (Crites & Rye, 2020). This cyclical pattern aligns with broader arguments that DT works best as a human-centered, returnable process rather than a fixed linear sequence such as ADDIE (Shé et al., 2021). The process of formulating objectives rooted in established outcomes reflects a curriculum design sequence encompassing analysis, objective formulation, and decisions regarding content, methods, and evaluation (Januarti et al., 2023; Silitonga et al., 2023).

The joint negotiation observed in this study aligns with findings on English as a foreign language (EFL) teachers engaging in collaborative curriculum design, in which authorship is

shared, and decisions emerge gradually through discussion rather than from the initiative of a single designer (Wu et al., 2022). Nevertheless, the negotiation process remained bound by a rigid external document, namely the national Learning Outcomes for Phase B, a constraint not faced by designers in earlier research, as they had greater freedom to determine their own objectives once the general framework had been established (Crites & Rye, 2020). In a course tied to a national curriculum, the define stage therefore works more like translation, turning a fixed Learning Outcome into a classroom-ready product, rather than defining a problem from scratch.

This collaborative approach also reflects the dynamics of course design, in which students and instructors jointly determine assignment topics, learning objectives, and assessment decisions, rather than leaving them to a single party (Rutherford, 2020). One key distinction from the cases examined in previous research is the diversity of feedback sources involved here, ranging from instructors and peers to young learners themselves (Crites & Rye, 2020). Feedback from the lecturer and peers led to changes in the digital story itself (characters, story focus, structure) before delivery. In contrast, feedback from young learners, collected live during the classroom session, mostly changed how the story was told rather than the story itself. These findings align with evidence that feedback provided before implementation yields the greatest benefits for preservice teachers' digital narrative products, since post-implementation feedback has less time to influence revisions in a course conducted over only one iteration (Shinas & Wen, 2022).

Since both pairs in this study delivered their stories only once, the test stage served more as a final reflection than as a real second round of design, a limitation of the course timeline rather than a weakness of DT as a framework. The same timeline constraint also limited ideation depth for at least one pair, whose process stopped once the learning objective was technically met, despite the pair recognizing that a more exploratory process was possible. Limited time, both within this semester and during the eight weeks of the previous study, also restricted the extent to which the ideation and testing stages could be conducted (Crites & Rye, 2020).

This study's intentional, diverse character representation, particularly the strength-based portrayal that folded the wheelchair-using character into a broader diverse cast rather than singling him out, aligns with calls in children's literature research for representation that positions disability as capable participation rather than pity or inspiration (Hayden & Prince, 2023; Koss, 2015). Language-focused case studies in previous research have not yet addressed considerations at this stage of empathy (Crites & Rye, 2020). It also echoes the national curriculum's framing of English learning as a means for cross-cultural communication.

The engagement strategies and repetitive language patterns that both pairs built into their stories reflect established TEYL principles rather than arbitrary creative choices, aligning with how young learners engage most through concrete, emotionally involving experiences and with how TEYL literature emphasizes repetition, visual support, and simple narrative structure in age-appropriate Digital Storytelling. This suggests that even without naming TEYL principles directly, both pairs' choices at the ideate and prototype stages were shaped by an intuitive sense of what keeps young learners engaged.

The ethical question raised by generative AI use in this study's prototype stage is not extensively addressed by earlier DT literature on curriculum design, since digital stories function as pedagogical tools for language exposure and meaning-making rather than just technological products, making the appropriateness of the tool itself part of the ethical question (Robin, 2008). The case-by-case reasoning observed here reflects a broader concern in recent reviews of generative AI in education, where ethical judgment tends to be worked out in situ rather than by fixed rules (García-López & Trujillo-Liñán, 2025). This indicates that incorporating AI-based digital storytelling requires designers to consider tool suitability alongside pedagogical and visual considerations at the prototyping stage. This consideration did not arise in earlier curriculum design cases, before the widespread use of generative AI (Crites & Rye, 2020).

Together, these findings suggest that DT for Curriculum Design offers pre-service teachers not deep creative iteration but a clearer, more reflective way of naming decisions that are otherwise treated as automatic, from vocabulary choices to character representation. This answers the second research question: integrating DT for Curriculum Design enhanced the design process in three ways. It gave pre-service teachers a structured way to negotiate objectives anchored to Phase B outcomes, made previously automatic decisions (representation, AI use) explicit and reasoned. It treated classroom delivery as a source of ongoing empathy data. However, its enhancement of the final products was constrained by the single-iteration course timeline, which limited how much revision could be applied to the artifact itself.

CONCLUSION

This case study suggests Design Thinking for Curriculum Design helps pre-service teachers translate a fixed national curriculum into classroom-ready materials through a reflective, cyclical rather than linear process. Across both pairs, the DT stages did not follow a straight line: empathy toward learners resurfaced well into the test stage, engagement gaps became visible only during piloting, and engagement strategies planned during ideation were reworked again during delivery. Unlike curriculum design situations where designers freely define their own problem, this course required translating an existing outcome, the Phase B Learning Outcomes, into a classroom-ready product through joint negotiation rather than individual authorship.

DT for Curriculum Design gave them a structure for that translation, turning decisions that might otherwise have felt automatic, such as character representation or the ethical use of AI tools, into something they could name and reason about openly. For teacher education programs, these findings suggest that DT for Curriculum Design works best as a returnable cycle rather than a one-time checklist. Programs adopting DT for Curriculum Design in similarly structured courses should consider building in a second delivery cycle, since feedback from young learners here mostly reshaped how a story was told rather than the story itself, a pattern close to that found in Crites & Rye (2020) under similarly tight timelines.

A second cycle would let that feedback reach the artifact itself, not just its delivery. Programs should also treat ethical and inclusive design choices, such as AI use and character representation, as an explicit part of the DT process once digital tools and diverse representation enter the prototyping phase, rather than leaving these considerations implicit.

This study's findings are limited by its single-semester timeline, small sample size, and single institutional setting, all of which constrained how far ideation and testing could progress. Further research could examine these same decisions over a longer timeline, with more participant pairs, or across different institutional settings to see whether these patterns hold more broadly.

AUTHOR'S NOTE

This study analyzed data from the pre-service teachers' regular coursework (digital storytelling artifacts, learning objectives, and reflection essays), rather than collecting new data directly from the young learners in the classroom piloting sessions, which were observed as part of the course's standard teaching practicum and yielded no personally identifiable information about those learners. Informed consent was obtained from the two pairs of pre-service teacher participants before the semi-structured interviews, and their identities have been anonymized throughout. The authors declare no conflict of interest, confirm this article is free of plagiarism, confirm all sources were properly cited, and confirm the article has not been previously published.

REFERENCES

- Astuti, N., & Hasibuan, K. (2025). Teaching English to Young Learners (TEYL): Strategies and challenges. *The Journal of English Language Teaching, Literature, and Applied Linguistics*, 7(1), 25-34.
- Baltador, L. A., Grecu, V., Panța, N. D., & Beju, A. M. (2024). Design thinking in education: Evaluating the impact on student entrepreneurship competencies. *Education Sciences*, 14(12), 1-25.
- Çetin, E. (2021). Digital storytelling in teacher education and its effect on the digital literacy of pre-service teachers. *Thinking Skills and Creativity*, 39(2), 1-21.
- Chang, S., & Suh, J. (2025). The impact of digital storytelling on presence, immersion, enjoyment, and continued usage intention in VR-based museum exhibitions. *Sensors*, 25(9), 1-23.
- Crites, K., & Rye, E. (2020). Innovating language curriculum design through design thinking: A case study of a blended learning course at a Colombian university. *System*, 94(1), 1-14.
- García-López, I. M., & Trujillo-Liñán, L. (2025). Ethical and regulatory challenges of Generative AI in education: A systematic review. *Frontiers in Education*, 10(1), 1-13.
- Ginting, D., Woods, R. M., Barella, Y., Limanta, L. S., Madkur, A., & How, H. E. (2024). The effects of digital storytelling on the retention and transferability of student knowledge. *Sage Open*, 14(3), 1-17.
- Hadj, B. H. (2024). The power of the narrative: Using digital storytelling to foster student motivation and participation. *Eurasian Science Review*, 2(6), 43-53.
- Hayden, H. E., & Prince, A. M. (2023). Disrupting ableism: Strengths-based representations of disability in children's picture books. *Journal of Early Childhood Literacy*, 23(2), 236-261.
- Henriksen, D., Gretter, S., & Richardson, C. (2018). Design thinking and the practicing teacher: Addressing problems of practice in teacher education. *Teaching Education*, 31(2), 209-229.
- Irfadila, M. S. (2025). Pengembangan analisis kebutuhan dan analisis situasi kurikulum pembelajaran bahasa. *Inovasi Pendidikan*, 12(1), 24-34.
- Isaacs, M., Tondeur, J., & Vaesen, J. (2024). Digital storytelling in teacher education: Developing pre-service teachers' critical thinking. *Australasian Journal of Educational Technology*, 40(3), 92-109.

- Januarti, V., Marmoah, S., & Sriyanto, M. I. (2023). Perencanaan pembelajaran fase A dalam implementasi Kurikulum Merdeka di sekolah dasar. *Didaktika Dwija Indria*, 11(3), 25-28.
- Kasemsarn, K., & Nickpour, F. (2025). Digital storytelling in cultural and heritage tourism: A review of social media integration and youth engagement frameworks. *Heritage*, 8(6), 1-24.
- Koss, M. D. (2015). Diversity in contemporary picturebooks: A content Analysis. *Journal of Children's Literature*, 41(1), 32-42.
- Li, T., & Zhan, Z. (2022). A systematic review on design thinking integrated learning in K-12 education. *Applied Sciences*, 12(16), 1-34.
- Niqie, M. S. R., & Ahid, N. (2023). Desain kurikulum pembelajaran bahasa Arab kontemporer. *Indonesian Journal of Humanities and Social Sciences*, 4(1), 37-58.
- Purnama, S., Ulfah, M., Ramadani, L., Rahmatullah, B., & Ahmad, I. F. (2022). Digital storytelling trends in early childhood education in Indonesia: A systematic literature review. *JPUD-Jurnal Pendidikan Usia Dini*, 16(1), 17-31.
- Rahman, F., Asirah, A., Saputra, N., Muntasir, M., & Safitri, R. (2025). Teaching English for Young Learners (TEYL) in Indonesia: Policies, implementations, and future directions. *Seulanga: Jurnal Pendidikan Anak*, 6(2), 84-100.
- Robin, B. R. (2008). Digital storytelling: A powerful technology tool for the 21st century classroom. *Theory Into Practice*, 47(3), 220-228.
- Romadhon, M. G. E., Dzulfikri, D., & Ubaidillah, M. F. (2024). Non-english major teachers'experiences of Teaching English for Young Learners (TEYL): A phenomenological study. *LLT Journal: A Journal on Language and Language Teaching*, 27(1), 320-335.
- Rösch, N., Tiberius, V., & Kraus, S. (2023). Design thinking for innovation: Context factors, process, and outcomes. *European Journal of Innovation Management*, 26(7), 160-176.
- Rutherford, S. (2020). Engaging students in curriculum development through design Thinking: A course design case. *International Journal of Designs for Learning*, 11(3), 107-125.
- Shé, C. N., Farrell, O., Brunton, J., & Costello, E. (2021). Integrating design thinking into instructional design: The #OpenTeach case study. *Australasian Journal of Educational Technology*, 38(1), 33-52.
- Shinas, V. H., & Wen, H. (2022). Preparing teacher candidates to implement digital storytelling. *Computers and Education Open*, 3(1), 1-8.
- Silitonga, E. P. S., Purba, J., & Turnip, H. (2023). Paradigma dan perencanaan kurikulum. *Jurnal Pendidikan Sosial dan Humaniora*, 2(1), 147-155.
- Sreenivasan, A., & Suresh, M. (2024). Design thinking and artificial intelligence: A systematic literature review exploring synergies. *International Journal of Innovation Studies*, 8(3), 297-312.
- Temel, T., & Yilmaz, C. (2025). Investigating the impact of digital storytelling on EFL learners' language motivation levels. *Journal of Educational Technology and Online Learning*, 8(2), 164-189.
- Thornhill-Miller, B., Camarda, A., Mercier, M., Burkhardt, J., Morisseau, T., Bourgeois-Bougrine, S., Vinchon, F., Hayek, S. E., Augereau-Landais, M., Mourey, F., Feybesse, C., Sundquist, D., & Lubart, T. (2023). Creativity, critical thinking, communication, and collaboration: Assessment, certification, and promotion of 21st century skills for the future of work and education. *Journal of Intelligence*, 11(3), 1-32.
- Wu, Z., Li, J., & Cheng, L. (2022). Understanding EFL teacher engagement in TDTs' collaborative curriculum design: A Chinese case study from the Activity Theory Perspective. *Frontiers in Psychology*, 13(1), 1-8.