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Integrating Traditional Games into Literacy Instruction: The Development of 'Cak Ingkling' Media for Early Reading Skills

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ABSTRACT

Early literacy skills form the cornerstone of academic success, yet many first-grade students in primary schools struggle with foundational reading competencies due to limited access to contextual learning media. This research aimed to develop a non-digital, game-based learning medium called "Cak Ingkling" and evaluate its validity, practicality, and pedagogical potential for lower-grade primary school classrooms. The study employed a Research and Development (R&D) methodology using the ADDIE model integrated with Tessmer's formative evaluation framework, spanning expert review, one-to-one, small group, and field testing phases. Data were gathered through validation sheets, user questionnaires, and structured observations. Evaluation results confirmed high feasibility: content validation reached 87.2% (Excellent), instructional design scored 84.2% (Good), and media expert validation achieved 87.3% (Excellent). Classroom field trials with first-grade students produced an overall practical and positive user response score of 87.2% (Excellent). The study concludes that the "Cak Ingkling" learning medium, as a culturally responsive innovation, shows strong potential as a valid and practical instructional tool for fostering student participation and supporting early reading engagement in resource-constrained primary school settings, although measurable reading achievement gains remain to be empirically tested through future longitudinal experimental designs.

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INTRODUCTION

Early literacy development represents one of the most critical and foundational aspects of a child's educational journey. The ability to read, recognize letters, and construct meaning from written language during the early years of schooling serves as the primary gateway through which students access all subsequent academic learning. In Indonesian primary education, reading acquisition occupies a central position within the language curriculum, directly enabling students to engage with and comprehend content across all subjects.

Education in Indonesia is grounded in a legal framework that emphasizes the holistic development of every learner. As stipulated in Government Regulation Number 57 of 2022 concerning National Education Standards, education must constitute a conscious and planned effort to optimize students' cognitive, moral, and social potentials (Lesnawati & Khadafie, 2025). However, the reality in many resource-limited schools often diverges from this ideal; research consistently documents a reliance on teacher-centered pedagogy, rote memorization, and exclusive textbook use (Mubin & Juniar, 2023). This mismatch creates both motivational and

cognitive barriers for young learners in the concrete operational stage who naturally require hands-on, playful, and experiential instruction (Tohari & Rahman, 2024).

To bridge this gap, instructional media must function as conduits between abstract language concepts and the concrete experiences that young learners need to make sense of new information (Pratama et al., 2025). When carefully designed and matched to learners' developmental characteristics, instructional media can stimulate curiosity, sustain motivation, facilitate comprehension, and promote active participation. In the context of early literacy, media that incorporate visual elements, kinesthetic activities, and social interaction have demonstrated particular effectiveness, as they align with the multimodal learning preferences of young children. (Audina et al., 2022) confirm that educational game-based media can significantly increase student motivation and classroom engagement, while (Bambang et al., 2024) further demonstrate that interactive media helps students approach Indonesian language material with greater ease and enjoyment.

Play-based learning has gained considerable theoretical and empirical currency as a pedagogical approach for early childhood and primary education. Rooted in the developmental theories of Piaget and Vygotsky, play is understood not merely as recreational activity but as a primary vehicle through which young children develop cognitive, linguistic, social, and emotional competencies. Vygotsky's concept of the zone of proximal development is particularly relevant: structured play activities guided by more knowledgeable peers or adults can scaffold children's emerging literacy skills in ways that direct instruction alone cannot (Bodrova & Leong, 2024). More recent research underscores these foundations, with studies demonstrating that game-integrated literacy activities lead to superior word recognition, phonemic awareness, and reading motivation compared to conventional instructional approaches (Størksen et al., 2023).

Traditional games, in particular, occupy a distinctive pedagogical space within the Indonesian educational context. Games such as engklek, congklak, gobak sodor, and cak ingkling are deeply embedded in the cultural life of Indonesian communities and are familiar to children from diverse socioeconomic backgrounds. Their cultural familiarity lowers affective barriers to participation, making them natural entry points for educational integration. The physical movement inherent in many traditional games supports the kinesthetic learning needs of young children who benefit from whole-body engagement rather than desk-bound activities (Maryanti et al., 2021). Furthermore, traditional games inherently promote social interaction, turn-taking, and cooperative learning, which are recognized as important developmental experiences in early childhood education (Rahayu et al., 2022).

The concept of culturally responsive pedagogy provides an important theoretical lens for understanding the value of traditional game integration in Indonesian classrooms. Culturally responsive teaching involves leveraging students' cultural backgrounds, experiences, and knowledge as resources for learning rather than obstacles to be overcome (Fitri, 2022). When instructional media draw on cultural practices familiar to students, they not only enhance motivation and engagement but also communicate respect for students' identities and communities, which research suggests has a positive effect on academic outcomes (Hanaris, 2023). Developing instructional media that build on students' existing cultural knowledge thus represents a pedagogically and culturally aligned strategy for early literacy development.

Despite the well-documented benefits of game-based and culturally relevant instructional media, a significant gap persists in many Indonesian primary schools, particularly in underserved or resource-limited settings. Most previously developed learning media have

focused on digital technologies, including computer-based applications, interactive whiteboards, and mobile learning platforms (Husna & Supriyadi, 2023; Nurhidayati, 2024). While these digital media offer clear advantages in terms of engagement and information richness, they remain fundamentally inaccessible to schools lacking reliable electricity, internet connectivity, or device infrastructure. This digital divide risks exacerbating educational inequity unless complemented by non-digital, low-cost, and context-appropriate alternatives (Sumartini et al., 2025).

Preliminary observations and needs analysis conducted at SD Negeri 08 OKU revealed that the school, like many primary schools in the Ogan Komering Ulu (OKU) district of South Sumatra, faces precisely these challenges. The school serves a student population from predominantly low-income families, with limited access to digital devices or internet infrastructure. Teachers rely primarily on textbooks and blackboard instruction, and the few available instructional media tend to be generic and not specifically designed for the literacy needs of first-grade students. Classroom observations revealed that students frequently exhibited signs of disengagement, including off-task behavior, passive listening, and reluctance to participate in reading activities. These observations aligned with broader patterns documented in Indonesian educational research, where motivational deficits in early literacy instruction have been linked to the absence of engaging, age-appropriate, and interactive learning media (Halidah et al., 2024; Khoerunnisa et al., 2024).

Several prior studies lend empirical support to the approach taken in this research. (Tasiah et al., 2024) demonstrated that traditional engklek-based media effectively developed literacy comprehension among primary school students, while (Maryanti et al., 2021) found that board games derived from traditional Indonesian games significantly improved student motivation and engagement. (Rahayu et al., 2022) specifically documented the effectiveness of engklek-based media for Indonesian language learning in primary school. (Butarbutar et al., 2024) highlighted that modified traditional games serve as highly suitable learning media for young learners when designed with attention to visual appeal, safety, and ease of use. (Firjatullah et al., 2025) further confirmed that traditional game-based media can improve early reading engagement and learning interest in lower primary grades when the media incorporate direct physical interaction and simple materials. These converging lines of evidence provided a strong theoretical and empirical rationale for the development of the "Cak Ingkling" learning medium.

The present study addresses a critical and distinct gap in current educational development research by designing, validating, and practically evaluating a game-based instructional tool explicitly tailored for low-resource primary school environments. While the intersection of traditional games and literacy has been explored conceptually, a substantial portion of recent educational media innovations heavily favors digital platforms, which inadvertently exacerbates the educational divide in underserved regions lacking standard technological infrastructure. Unlike prior studies that often overlook systematic multi-stage evaluation frameworks or prioritize technology-heavy applications, this research introduces a non-digital, low-cost, and highly interactive alternative grounded in culturally responsive pedagogy. By systematically integrating the ADDIE design model with Tessmer's rigorous formative evaluation framework comprising expert review, one-to-one, small group, and field testing stages, this study ensures that the developed tool is structurally and instructionally sound before widespread classroom application. It is vital to clarify, however, that the scope of this study centers primarily on establishing the media's validity, structural feasibility, and

implementation practicality, as well as gauging student engagement and participation during early reading instruction, rather than measuring direct longitudinal reading achievement gains.

The distinctive novelty of this study lies in its integration of four elements that, to date, have rarely been combined within a single research design: (1) the systematic adaptation of a traditional Indonesian game as an instructional medium; (2) the deliberate use of low-cost, non-digital materials designed for classrooms with constrained technological infrastructure; (3) an explicit focus on early literacy instruction, specifically syllable recognition and early reading engagement, as the targeted learning domain; and (4) the application of a rigorous multi-stage formative evaluation design integrating the ADDIE model with Tessmer's framework to ensure evidence-based validation at every developmental stage. By empirically demonstrating that non-digital, culturally embedded play artifacts can serve as robust pedagogical scaffolds in heterogeneous, resource-constrained classrooms, this study provides a vital and replicable model for educators and researchers in developing educational contexts. It expands the current discourse on early childhood literacy by establishing a concrete framework for non-digital instructional interventions that honor local culture while directly addressing the practical realities of infrastructure-challenged schools.

METHOD

Research Design

This study employed a Research and Development (R&D) methodology, which is geared toward designing, developing, and evaluating tangible instructional products to address practical educational problems (Sugiyono, 2024). The development of the "Cak Ingkling" media was systematically guided by the five phases of the ADDIE instructional design model: Analysis, Design, Development, Implementation, and Evaluation. To ensure rigorous quality control at every developmental stage, the ADDIE framework was structurally integrated with Tessmer's formative evaluation design. It is crucial to clarify a methodological distinction regarding the scope of evaluation in this study: effectiveness is conceptualized here as product usability, implementation practicality, and positive student participation during instructional trials, rather than direct outcome-based academic reading achievement gains measured through pre-test and post-test experimental parameters. This scoping decision reflects the authentic conditions of the study and the formative purpose of the evaluation framework employed.

Participants and Setting

The study was conducted at SD Negeri 08 OKU, located in the Ogan Komering Ulu (OKU) district of South Sumatra, Indonesia. The school serves a predominantly low-income student population with limited access to digital devices and internet infrastructure, making it a contextually appropriate setting for the development and evaluation of non-digital instructional media. Participants included the Class I.A first-grade teacher, who contributed to the needs analysis and expert material validation, and 24 first-grade students who participated in the three trial stages. For the one-to-one evaluation, three students representing high, average, and low academic achievement levels were purposively selected. For the small group evaluation, nine students representing diverse ability profiles were recruited. The full class of 24 students participated in the field trial.

Product Development Procedure

During the Analysis phase, the researcher conducted a comprehensive needs assessment including classroom observations, semi-structured interviews with the first-grade teacher, and analysis of student learning records. This analysis confirmed that students demonstrated limited engagement with existing instructional materials and that the school's infrastructure precluded

technology-dependent media. The analysis identified early reading specifically phoneme recognition, syllable identification, and simple word reading as the priority learning domain for media development.

The Design phase involved formulating specific learning objectives aligned with the Basic Competencies (KD) and Learning Achievement (CP) standards for first-grade Indonesian language education, and conceptualizing the core components of the medium: a printed banner depicting the traditional cak ingkling game pattern, a set of syllable reading cards (kartu suku kata) with graduated difficulty levels, and a star card reward system (kartu bintang) to motivate continued participation (Tohari & Rahman, 2024). The Development phase involved physical production of the prototype using accessible and affordable materials thick cardboard, colored paper, markers, and laminated card stock with attention to visual clarity, age-appropriateness, and physical durability.

The Implementation phase operationalized Tessmer's framework across three iterative stages: a one-to-one evaluation with three students on April 1, 2026; a small group evaluation with nine students on April 4, 2026; and a final field trial with all 24 students of Class I.A on April 6, 2026. Each stage was followed by a targeted revision cycle before proceeding to the next stage.

Instruments

Three types of instruments were used. Expert validation questionnaires, structured on a five-point Likert scale, were administered to a subject matter expert (15 items), an instructional design expert (15 items), and a media technology expert (12 items). Student response questionnaires were administered at each trial stage (12 items at one-to-one; 15 items at small group; 10 items at field trial). An observation checklist was used by the researcher to record behavioral engagement indicators during each trial session. The scoring framework for interpreting percentage outcomes followed Pebriantika et al. (2024): 86–100% = Excellent; 76–85% = Good; 56–75% = Fair; below 55% = Poor. To minimize observational bias and ensure reliability, the classroom teacher acted as an independent co-observer alongside the primary researcher. Any minor discrepancies in behavioral tallies during trial sessions were immediately cross-examined and resolved through post-session consensus.

Data Collection

Quantitative data were collected through the completed expert validation questionnaires and student response questionnaires at each trial stage. Qualitative data were gathered through semi-structured teacher interviews conducted during the Analysis phase, open-ended comments solicited from expert validators on the validation sheets, and structured observation notes recorded by the researcher throughout each trial session using a standardized observation checklist.

Data Analysis

Quantitative data were analyzed using a frequency distribution formula adapted from (Wijaya et al., 2022), in which item scores were summed and divided by the ideal maximum score to yield percentage ratings. These percentages were then classified using the (Pebriantika et al., 2024) framework described above. Qualitative data from teacher interviews and expert comments were analyzed using thematic content analysis: transcripts and written feedback were first read in full, then coded by recurring themes (e.g., material difficulty, clarity of instructions, visual quality), and finally synthesized into descriptive findings that informed each revision cycle. Observational records were analyzed by tallying frequency counts for behavioral engagement indicators (e.g., on-task participation, spontaneous peer interaction, response

attempts) across sessions, and interpreting these patterns in conjunction with questionnaire scores to triangulate the overall picture of media practicality and student participation. This mixed-data triangulation approach ensured that product feasibility was comprehensively assessed across both technical quality and authentic user experience dimensions, consistent with established practices in educational R&D.

RESULTS AND DISCUSSION

Results

The product development process began with a comprehensive analysis of the learning environment at SD Negeri 08 OKU. Teacher interviews and classroom observations confirmed that first-grade students experienced persistent difficulties with early reading, specifically in recognizing letters, distinguishing syllables, and constructing simple words. The teacher reported that existing instructional approaches, primarily textbook-driven and lecture-based, were insufficient to sustain student motivation or to provide the kind of repeated, varied practice that early reading development requires. Students were described as quickly losing interest during reading activities and frequently requiring individual attention to remain on task. These findings directly shaped the instructional objectives and design parameters of the "Cak Ingkling" medium, which was developed to provide an active, game-structured, and visually engaging alternative to conventional reading instruction.

The initial prototype of the "Cak Ingkling" medium consisted of three primary components, each designed to support a distinct aspect of the learning experience. The first component, a large printed banner depicting the traditional cak ingkling hopscotch pattern with numbered squares, served as the primary physical play space designed with bright colors and a clear layout to attract student attention. The second component, the syllable reading cards (kartu suku kata), contained vowels, consonant-vowel combinations, and syllable sequences drawn from the first-grade Bahasa Indonesia curriculum, printed in large, clear fonts with accompanying illustrations. The third component, the star cards (kartu bintang), functioned as a reward mechanism in which students who answered syllable card prompts correctly received star cards serving as individual achievement indicators and group competition markers. Together, these components created a learning system integrating physical movement, cognitive activity, and motivational reinforcement.

Expert validation results confirmed strong feasibility across all three assessment domains. Material expert validation, conducted by a Bahasa Indonesia subject teacher at SD Negeri 08 OKU on March 5, 2026, produced an overall score of 1,308 across 15 assessment items, yielding an average of 87.2% (Excellent, Grade A). Individual item scores ranged from 85% to 89%, with the highest scores recorded for clarity of instructions (89%), support for student active participation (89%), and appropriateness of instructional directives (89%). The lowest score of 85% was recorded for difficulty level alignment with student developmental stage. The expert recommended the addition of more card varieties in subsequent iterations to further enrich students' vocabulary exposure.

Table 1. Results of Material Expert Validation

No	Rated aspect	Value	Percentage (%)
1	The material aligns with learning objectives	88	88%
2	The material supports competency achievement	89	89%
3	The material is presented systematically	87	87%
4	The order of presentation facilitates understanding	86	86%
5	Facts and examples are based on reliable sources	88	88%
6	The depth of the material is appropriate for grade 1 of	88	88%

	elementary school.		
7	Examples and illustrations are appropriate for grade 1 of elementary school	87	87%
8	The language used is appropriate for grade 1 of elementary school.	87	87%
9	Vocabulary is appropriate for grade 1 of elementary school	86	86%
10	Instructions are presented clearly	89	89%
11	Media makes students active	89	89%
12	Media builds self-confidence	86	86%
13	Media helps students answer questions	86	86%
14	Questions align with learning objectives	87	87%
15	Questions difficulty level is developmentally appropriate	85	85%
	Amount	**1308**	
	Average	**87.2**	**87.2%**
	Description	**Excellent**	
	Predicate	**A**	

Instructional design validation, conducted by an educational technology specialist from Universitas Baturaja on March 7, 2026, generated a total score of 1,263 across 15 assessment items, corresponding to an average of 84.2% (Good, Grade B). The highest scores of 87% were recorded for systematic organization of learning steps, while the lowest scores of 82% were observed for relevance of material to game activities, clarity of usage instructions, and alignment of evaluation forms with learning objectives. The validator's primary recommendation was to refine the pedagogical strategy underpinning the medium to ensure fuller alignment between game mechanics and instructional goals, which was subsequently addressed before the trial stages.

Media expert validation, conducted by a multimedia specialist from Universitas Baturaja on March 3, 2026, produced a total score of 1,048 across 12 assessment items, with an average of 87.3% (Excellent, Grade A). Item scores were notably consistent, ranging from 86% to 88%. The highest scores of 88% were recorded for image quality, color selection, color harmony, appropriateness for the target age group, instruction clarity, material quality, and safety for young students. The validator specifically commended the age-appropriate color palette and physical safety of the components, and recommended that similar media be developed for other subject areas. The combined validation score across all three experts totaled 3,619, yielding an overall average of 86.23% (Excellent).

The progressive improvement in student response scores across the one-to-one stage (85.1%), small group stage (86.2%), and field trial stage (87.2%) demonstrates the practical viability and alignment of the tool within the targeted classroom environment. However, these percentage metrics and their corresponding qualitative classifications must be interpreted carefully within the boundaries of product evaluation. These scores represent expert consensus on design quality and students' affective responses, user motivation, and ease of classroom operational use. They do not serve as direct empirical measures of reading achievement gains. Because this study did not implement a controlled pre-test and post-test experimental design, these data establish a strong case for media practicality and classroom participation, but do not provide statistical proof of direct cognitive reading advancement.

One-to-one evaluation was conducted on April 1, 2026, with three students (anonymized as S1, S2, and S3, representing high, average, and low achievement levels respectively. Aggregate scores across 12 questionnaire items totaled 3,065, producing an overall average of 85.1% (Good, Grade B). The highest scores of 86.6% were recorded for media visual appeal and desire to reuse the medium across other subjects. The lowest score of 83.3% was recorded for clarity

of material presentation, indicating that some students initially experienced difficulty understanding how to connect the card prompts with the game activities. This finding informed targeted revisions to the instructional script and the visual arrangement of card prompts prior to the small group trial.

Small group evaluation was conducted on April 4, 2026, with nine students, demonstrating a clear improvement over one-to-one trial outcome. Total scores across 15 questionnaire items reached 11,638, with an average of 86.2% (Excellent, Grade A). The highest scores of 87.1% were recorded for the item assessing comprehension enhancement, followed closely by 87.0% for learning facilitation. The lowest score of 85.4% was recorded for relevance of exercises to lesson content. Observational records noted that group interaction substantially increased students' willingness to attempt responses, with peer support and collaborative problem-solving emerging as natural features of the game-based format.

Field trial evaluation was conducted on April 6, 2026, with all 24 students of Class I.A. Total scores across 10 questionnaire items reached 20,949, yielding an average of 87.2% (Excellent, Grade A). All individual item scores fell within the Excellent category, ranging from 86.0% to 88.0%. The highest score of 88% was recorded for ease of classroom use ("Media Cak Ingkling mudah digunakan saat belajar di kelas"), while the second-highest scores of 87.9% and 87.8% were recorded for student desire to reuse the medium and for the medium's contribution to material retention respectively. The lowest score of 86.0% was recorded for ease of answering questions ("Pertanyaan pada media Cak Ingkling mudah dijawab oleh peserta didik"), reflecting the natural variation in early reading readiness within the class. Observational records noted high levels of student enthusiasm, sustained on-task behavior, and spontaneous peer encouragement throughout the session.

Table 2. Summary of Validation and Trial Results

Evaluation Stage	Participants / Validators	Score	Category
Material Expert Validation	1 expert	87.2%	Excellent
Instructional Design Validation	1 expert	84.2%	Good
Media Expert Validation	1 expert	87.3%	Excellent
One-to-One Evaluation	3 students	85.1%	Good
Small Group Evaluation	9 students	86.2%	Excellent
Field Trial	24 students	87.2%	Excellent

Discussion

The findings of this study provide compelling evidence that the "Cak Ingkling" learning medium is a highly valid and practical instructional tool for facilitating early reading engagement among first-grade primary school students. The consistently high validation scores across material, instructional design, and media dimensions confirm that the medium satisfies the theoretical and technical standards required for high-quality educational media development. These results align with the broader literature on game-based learning, which consistently demonstrates that instructional media incorporating play elements increase student engagement, motivation, and active participation in early literacy contexts (Syofiyanti et al., 2025).

The material validation score of 87.2%, placing the medium in the Excellent category, indicates that the syllable-reading card content is appropriately calibrated to the cognitive developmental stage of first-grade students and is well-aligned with the Bahasa Indonesia curriculum's learning objectives. This finding supports (Tasiah et al., 2024), who demonstrated that traditional game-based media are most effective when their content is explicitly designed to match the characteristics and learning needs of the target student population. The expert validator's recommendation to expand the card variety in future iterations further suggests that

the medium's instructional framework has the flexibility to accommodate richer and more differentiated content without structural redesign.

The instructional design validation score of 84.2% in the Good category, while slightly lower than the material and media scores, reflects the inherent complexity of designing game-based instructional sequences that maintain both pedagogical rigor and playful engagement simultaneously. The validator's recommendation to refine strategy alignment between game mechanics and learning objectives points to an area for continued development, consistent with (Maryanti et al., 2021), who found that the instructional effectiveness of traditional game-based media is significantly enhanced when the game structure is closely integrated with specific curricular content. The minor revision implemented following this validation, focused on strengthening the connection between game rules and learning objectives, contributed to the improvement of trial scores in subsequent evaluation stages.

The media validation score of 87.3% in the Excellent category demonstrates that the physical and visual design of the "Cak Ingkling" medium successfully meets the aesthetic and ergonomic requirements for effective early childhood instructional materials. The high scores for color appropriateness, image quality, and physical safety are particularly notable, as these elements directly influence young students' initial attraction to and sustained engagement with learning materials (Firjatullah et al., 2025). Research on visual learning design consistently emphasizes the importance of age-appropriate color schemes and clear typography in materials for emerging readers, as these features reduce cognitive load and support letter and word recognition. The "Cak Ingkling" medium's design choices, including bright, contrasting colors and large, unambiguous fonts, are thus directly aligned with evidence-based principles of early literacy instructional design.

The progressive improvement in student trial scores across one-to-one (85.1%), small group (86.2%), and field trial (87.2%) stages demonstrates the value of the iterative, formative evaluation approach adopted in this study. The one-to-one stage was particularly informative in identifying the initial difficulty students experienced in connecting syllable card prompts to game activities, leading to targeted revisions in instructional scripting and card layout. The small group stage revealed that social interaction and peer collaboration are not merely byproducts of the game format but active mechanisms of learning, as students who worked together consistently demonstrated greater willingness to attempt challenging card prompts. This finding is consistent with sociocultural theory and with (Butarbutar et al., 2024), whose research demonstrates that traditional game-based media significantly increase social interaction and cooperation when used in small groups.

The field trial results, with all items scoring in the Excellent category, indicate that the medium was practical and positively received at the classroom scale, a critical test of its implementation viability. The highest field trial score of 88% for ease of classroom use is particularly meaningful from a teacher's perspective, as it indicates that the medium is sufficiently straightforward to implement without specialized training or complex logistical preparation. (Susanti et al., 2024) similarly found that game-based instructional media are most readily adopted by classroom teachers when they are easy to prepare, require minimal technology, and integrate naturally into existing lesson structures. The "Cak Ingkling" medium's low-tech, low-cost design directly addresses these practical considerations, making it a feasible option for adoption in comparable resource-limited school settings.

The results of the formative evaluation iterations provide a promising indication that the “Cak Ingkling” learning medium offers a viable alternative for lower-grade literacy instruction. The steady progression of user response ratings from the one-to-one stage (85.1%) to the small

group stage (86.2%) and finally the classroom field trial (87.2%) suggests potential for enhancing classroom participation dynamics. Lowering affective barriers through familiar physical play mechanics appears to reinforce immediate task persistence and alphabet recognition among young learners.(Ali et al., 2025; Erwin et al., 2022)However, these outcomes must be interpreted with caution. Because the classroom field trial was conducted within a restricted timeframe in a single school cohort, the high engagement scores may partially reflect a novelty effect. The short-term excitement of interacting with a new physical setup, combined with the presence of the research team and active peer collaboration, can temporarily elevate student enthusiasm. Therefore, these metrics serve as initial evidence of the tool's immediate practicality and alignment with local classroom settings rather than proof of sustained instructional transformation. To build a definitive case for long-term reading proficiency growth, future outcome-based studies must employ comparative psychometric testing over an extended instructional period.(Rahayu et al., 2022).

From the perspective of novelty and scholarly contribution, this study makes a distinctive and meaningful addition to the existing literature on instructional media development for Indonesian primary education. Most prior work in this domain has focused on digital or technology-dependent instructional media, leaving a significant gap in the evidence base for non-digital, culturally embedded alternatives suited to resource-limited school contexts (Ardhianto et al., 2024). The present study directly addresses this gap by demonstrating that a carefully designed, culturally grounded, and systematically validated traditional game-based medium can achieve high levels of instructional practicality and user engagement while remaining accessible to schools without technology infrastructure. The integration of Tessmer's multi-stage formative evaluation framework with the ADDIE development model also represents a methodological contribution, providing a replicable and rigorous template for future instructional media development research in similar contexts.

In terms of practical and theoretical contributions, this research strengthens the case for culturally responsive pedagogy as a framework for instructional media design in diverse, resource-constrained educational contexts. By demonstrating that a medium rooted in a familiar traditional game can simultaneously foster active student participation, increase motivation, and promote cooperative social learning, the study provides empirical grounding for theoretical arguments about the educational potential of cultural practices in formal schooling. The findings also contribute to the growing body of literature documenting the value of game-based learning at the early primary level, adding a culturally specific and non-digital dimension that has been underrepresented in predominantly Western-centric research on educational games. Future research building on these findings might explore the adaptation of "Cak Ingkling" and similar traditional game-based media to other subject areas, grade levels, or cultural contexts, as well as investigating long-term effects on reading fluency through longitudinal experimental designs.

CONCLUSIONS

This study successfully developed and evaluated a non-digital, game-based learning medium called "Cak Ingkling" tailored for first-grade primary literacy instruction. Methodological validation and formative classroom trials confirm that the developed tool meets rigorous educational criteria for validity and implementation practicality. The research demonstrates that meaningful, structured instructional design can be effectively accomplished using tangible, low-cost materials, offering a viable alternative for classrooms operating without digital infrastructure.

The primary contribution of this study lies in establishing a replicable framework for integrating traditional play with early literacy instruction within low-resource environments. However, because the evaluation was bounded by a short-term trial in a single-school setting, broad effectiveness regarding cognitive skill acquisition cannot be claimed. This limitation underscores the necessity for future research to transition from implementation feasibility to outcome-based testing. Future studies should employ rigorous experimental or longitudinal designs with standardized pre-test and post-test instruments to empirically measure objective reading achievement gains over time.

This study has several limitations that should be acknowledged. First, the study was conducted with a single first-grade class at one primary school in the OKU district, which constrains the generalizability of the results to other schools, regions, or student populations. Second, the research did not include a pre-test and post-test design to measure reading gains attributable to the medium. Third, the duration of the trial phases was relatively short, limiting the ability to assess long-term impact on reading development. Future research should address these limitations by conducting comparative studies with larger, more diverse samples; incorporating pre-test and post-test measures of early reading competencies; and exploring the medium's implementation over extended periods. Researchers might also investigate teacher professional development needs associated with traditional game-based media integration, as well as the potential to adapt the "Cak Ingkling" framework for other early literacy skills such as writing, spelling, and listening comprehension.

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AUTHOR CONTRIBUTION STATEMENT

Y, LP, HRS conceived and designed the research framework for the traditional game integration. Y conducted the primary needs analysis, managed the field trials at the school, and drafted the introduction and results sections. LP developed the instructional design instruments, performed the quantitative frequency data analysis, and formatted the evaluation tables. HRS structured the literature review on culturally responsive pedagogy, supervised the prototype development phase, and refined the discussion and conclusion sections. All authors participated in the final proofreading and approved the submitted version of the manuscript.

AI DISCLOSURE STATEMENT

The authors confirm that no artificial intelligence (AI) methodologies were employed in the conceptualization, execution, drafting, or editing of this study. To ensure the integrity and independent standards of scholarly publishing, all empirical data collection, data analysis, instructional design, and subsequent manuscript revisions were conducted exclusively by the human investigators.

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