

Bringing the Real World into First Grade: Meaningful Learning Innovation to Improve Student Learning Outcomes

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Abstract

A persistent challenge in first-grade education is the gap between abstract curricular content and young learners' concrete cognitive experiences, which can lead to disengagement and superficial learning. This study aimed to design, implement, and evaluate a Meaningful Learning-based pedagogical innovation that integrates real-world contexts into first-grade instruction. Using a Classroom Action Research (CAR) design conducted over two cycles, the study involved 24 first-grade students. The intervention incorporated thematic, authentic activities, including a class market and garden project. Data were collected through learning outcome tests, structured observations, student interviews, and portfolio analysis, using mixed-method analysis. Results showed a significant improvement in learning outcomes, with mean scores increasing from 68.5 in the pre-cycle to 83.7 after the intervention. Qualitative findings indicated increased student engagement, collaborative problem-solving, and students' ability to relate learning concepts to real-life experiences. Iterative improvements between cycles further enhanced the intervention's effectiveness. These findings suggest that Meaningful Learning, grounded in authentic real-world experiences, can support cognitive and affective learning outcomes among first-grade students. The study provides a practical model for teachers seeking to make early primary education more relevant and engaging.

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INTRODUCTION

The foundational years of primary education, particularly first grade, are pivotal in shaping students' academic trajectories and attitudes toward learning (Abdullah, 2020; Piaget, 1970). However, a persistent pedagogical challenge lies in the prevalent use of abstract, decontextualized instruction that often fails to resonate with the concrete operational cognitive stage of six- to seven-year-old children as described by Piaget (1970) (Smith, 2021). This disconnect can render core subjects like mathematics and language as mere rote exercises, leading to diminished engagement and superficial understanding. Research indicates that when initial learning experiences lack relevance, students struggle to form durable cognitive structures, adversely affecting their long-

term educational achievement (Jones & Lee, 2023). Consequently, there is an urgent need to reimagine pedagogical approaches that bridge the gap between classroom content and the lived realities of young learners. This study addresses this imperative by exploring the infusion of real-world contexts as a catalyst for meaningful comprehension in early primary education.

The theoretical underpinning for this innovation is drawn from Meaningful Learning theory, as conceptualized by David Ausubel, which posits that new information is optimally acquired when it is consciously and substantively linked to existing knowledge in the learner's cognitive framework (Antonio & Prudente, 2025). This theory shifts the focus from passive reception to active integration, demanding instructional designs that facilitate these connections (Novak, 2022; Ramsay-Jordan, 2020). In the context of first grade, the most potent existing knowledge is derived from children's daily interactions with their immediate environment their family, home, and community. Authentic learning paradigms further support this by advocating for the use of real-world problems and tools, thereby increasing intrinsic motivation and transferability of skills (Brown et al., 2022). Therefore, an educational model that systematically leverages these everyday experiences is not merely an additive activity but a fundamental reorientation toward how young children construct knowledge, moving from abstract symbolism to tangible understanding.

Despite robust theoretical support, a significant gap exists between the advocacy for authentic, meaningful pedagogy and its consistent, structured application in mainstream first-grade classrooms (Zviel-Girshin & Rosenberg, 2025). Many educators acknowledge the value of real-world connections but often relegate them to occasional projects rather than the central axis of curriculum delivery (Garcia, 2022). Furthermore, prevailing assessment systems frequently prioritize discrete, standardized knowledge over the applied competencies developed through contextual learning, creating a disincentive for pedagogical shift (Bascopé et al., 2019; Knight, 2020). This gap underscores a critical problem: without a clear and practical framework for implementation, the potential of Meaningful Learning through real-world contexts remains largely untapped, leaving many first-grade students disengaged from abstract curricular content. This study directly confronts this problem by developing, implementing, and evaluating a structured innovation that embeds real-world contexts into the core instructional routine.

This research proposes and investigates a targeted pedagogical innovation designed to integrate real-world contexts into the first-grade curriculum to foster Meaningful Learning. The approach involves the design of thematic learning modules where academic standards in mathematics, language, and science are taught through simulated and actual experiences from children's environments, such as managing a class garden for measuring growth or running a miniature store for arithmetic operations. The study posits that this deliberate integration will significantly enhance student learning outcomes, defined holistically to include academic achievement, engagement levels, and critical thinking skills. The new value and innovation of this work lie in its systematic translation of established learning theory into a reproducible classroom model, complete with practical activities and assessment strategies tailored for the first-grade setting, thereby providing empirical evidence and a clear pathway for educators to transform their teaching practice effectively.

METHOD

Research Design and Ethical Approval

This study employed a Classroom Action Research (CAR) design, which is a reflective and cyclical inquiry process aimed at simultaneously improving educational practices and generating practical knowledge. CAR is particularly suitable for addressing pedagogical problems in authentic classroom settings, allowing teachers to act as researchers of their own practice (Kemmis, McTaggart, & Nixon, 2023). The design followed the classic model of planning, acting, observing, and reflecting across multiple cycles to systematically test and refine the innovation of integrating real-world contexts into the first-grade curriculum.

Prior to data collection, ethical approval was obtained from the Institutional Review Board (IRB) of Universitas Pendidikan Indonesia under approval reference number [127/UNIV/EC/2025]. As this study involved minors (children aged 6–7 years), written informed consent was obtained from the parents or legal guardians of all participating students. Additionally, verbal assent was sought from the children in an age-appropriate manner. All data were anonymized to protect participant identities, and participation was voluntary with the right to withdraw at any time without consequence.

Participants and Context

The research was conducted at a public elementary school in an urban area, with the population being all first-grade students in the academic year 2023/2024. The sample was selected using a purposive sampling technique, focusing on one intact first-grade class comprising 24 students (12 male, 12 female), aged 6–7 years. This class was chosen as it represented a typical first-grade cohort in the school without any specialized programs. The inclusion criteria were: (1) enrollment as a first-grade student in the selected class, and (2) parental consent for participation. No students were excluded based on academic ability or background, as the study aimed to observe the intervention's effect on a heterogeneous classroom environment.

Given the small sample size (N=24 from a single classroom), the findings are primarily intended to provide an in-depth, contextualized understanding of the intervention's effects within this specific setting, rather than to claim statistical generalizability to all first-grade populations. However, the study draws on thick description and theoretically grounded mechanisms such as cognitive subsumption (Ausubel, 1968) and situated cognition (Brown, Collins, & Duguid, 1989) to support potential transferability to similar early primary contexts, particularly where learners face analogous challenges with abstract, decontextualized instruction. The sample demographics are summarized in Table 1.

Table 1. Characteristics of Research Participants

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	12	50%
	Female	12	50%
Age	6 years	10	41.7%
	7 years	14	58.3%
Prior Learning Outcome (Average Semester Score)	70–79	8	33.3%
	80–89	12	50.0%
	90–100	4	16.7%

Research Instrument

Data were collected using a mixed-methods triangulation strategy to obtain comprehensive evidence and strengthen the credibility and validity of the research findings (Creswell & Clark, 2022). The use of multiple data collection techniques enabled the researchers to examine learning outcomes from both quantitative and qualitative perspectives. Quantitative data were obtained through learning outcome tests and structured observations, while qualitative data were gathered through student interviews and portfolio analysis. The instruments were developed based on the learning objectives, characteristics of first-grade students, and indicators of meaningful learning, particularly student engagement, collaboration, task persistence, and the ability to connect classroom concepts with real-world experiences. Prior to implementation, the instruments were reviewed and tested to establish their content validity, reliability, and consistency of measurement. The instruments used in the study are described below.

Learning Outcome Tests

Learning outcome tests were developed by the researchers to measure students' achievement in mathematics and language arts based on the first-grade curriculum standards. The initial item pool consisted of 30 items, comprising multiple-choice and short-answer questions, with 15 items allocated to each subject. The mathematics items assessed students' understanding of basic numeracy operations and simple word problems, whereas the language arts items focused on reading comprehension and vocabulary. These competencies were selected because they represented the core learning objectives addressed through the meaningful learning activities implemented in the study.

To establish content validity, the test items were reviewed by two external experts with relevant professional backgrounds: a professor of early childhood education and a senior primary school teacher with more than 15 years of teaching experience. Each expert evaluated the relevance of the items to the intended learning objectives using a four-point rating scale. The resulting Scale-level Content Validity Index (S-CVI) was 0.91, indicating excellent content validity. Following the expert review, a pilot test was conducted with 20 first-grade students from a different class who were not involved in the main study. Reliability analysis produced a Cronbach's Alpha coefficient of 0.87, demonstrating good internal consistency. The validated test was subsequently used to measure students' learning achievement before and after the intervention.

Structured Observation Sheets

Structured observation sheets were employed to document students' behavioral engagement and participation throughout the implementation of real-world learning activities. The observation protocol was designed to capture behaviors that reflected meaningful learning, particularly students' ability to remain engaged, interact with peers, persist in completing tasks, and apply classroom knowledge to authentic situations. Four key behavioral indicators were therefore observed: sustained attention, peer interaction, task persistence, and the use of real-world reasoning.

Each indicator was assessed using a five-point Likert scale, allowing the researchers to systematically record variations in students' engagement across learning activities. To strengthen the reliability of the observational data, inter-rater reliability was established through simultaneous

observations conducted by the classroom teacher and an independent observer. Both observers independently rated students during three 30-minute learning sessions. The results demonstrated 90% agreement between the raters, with a Cohen's kappa coefficient of 0.85, indicating strong inter-rater reliability. The observation data were subsequently used to complement the quantitative learning outcome data and provide evidence of changes in students' classroom engagement and collaborative behaviors.

Student Interview Guides

Semi-structured interviews were conducted to explore students' perceptions and experiences of the meaningful learning activities. Interviews were considered particularly important because young learners' experiences and perceptions cannot be fully captured through test scores or behavioral observations alone. The interview questions were therefore designed in simple and age-appropriate language to encourage students to describe what they learned, how they experienced the activities, and how they perceived connections between classroom learning and their everyday lives.

Six students were purposively selected for individual interviews, representing different levels of prior achievement: two students with low achievement, two with average achievement, and two with high achievement. Each interview lasted approximately 5–7 minutes. The questions focused on three main areas: students' perceptions of the meaningfulness of learning, their enjoyment and engagement during the activities, and their ability to recognize connections between classroom concepts and real-world experiences. Guiding questions included, "What did you learn from the class market?" and "Why is math useful?" The interviews were audio-recorded and transcribed verbatim to preserve the students' responses and facilitate subsequent thematic analysis.

Together, these instruments provided complementary sources of evidence for examining the effectiveness of the intervention. The learning outcome tests captured changes in students' cognitive achievement, the observation sheets documented behavioral engagement and participation, while the interviews provided insight into students' subjective experiences and perceptions of the learning process. This triangulation of data sources enabled the researchers to develop a more comprehensive understanding of how meaningful, real-world learning influenced first-grade students' learning experiences and outcomes.

Procedure

The research procedure was executed over two cycles, each spanning three weeks. The pre-cycle phase involved administering initial learning tests and observing baseline classroom conditions. Cycle 1 began with planning thematic modules (class market for arithmetic; garden project for measurement and observation). The action phase involved implementing these modules, while observation concurrently collected test scores, engagement data, and work portfolios. The reflection phase analyzed the data, identifying strengths (high motivation) and weaknesses (some students struggled with multi-step tasks). Cycle 2 was then planned to refine the intervention by adding more visual aids (e.g., flowcharts for transactions) and peer scaffolding roles (expert-novice dyads), before repeating the action-observation-reflection process.

Data Analysis

Quantitative data from learning tests were analyzed descriptively (mean, standard deviation) and inferentially using paired sample t-tests to compare pre-cycle and end-of-cycle scores, with statistical significance set at $p < 0.05$, processed using SPSS version 26. Qualitative data from observations, interviews, and documents were analyzed thematically through the stages of data reduction, data display, and conclusion drawing/verification, as guided by Miles, Huberman, and Saldaña (2020). Coding was conducted by two independent coders, with discrepancies resolved through discussion. The final stage involved integrating findings from both data strands through a side-by-side comparison in a joint display table (see Table 2) to provide a coherent and nuanced interpretation of how the innovation influenced student learning outcomes.

Table 2. Joint Display of Integrated Data Analysis for Cycle 1

Quantitative Theme (Test Results)	Supporting Quantitative Data	Qualitative Theme (Observation & Interview)	Supporting Qualitative Evidence	Meta-Inference
Improved Arithmetic Skills	Mean score increased from 68.5 to 78.2	Contextual Understanding of Math	"I counted the change when I bought pencils at our class shop." (Student A)	Real-world simulation helped translate abstract operations into concrete, applicable skills.
Higher Engagement Correlates with Score Gain	High-engagement group (n=15) had a 12.3-point mean increase vs. 6.8 for low-engagement group (n=9)	Active Participation and Peer Collaboration	"We measured the plant together and argued about using a ruler or string." (Student C); observed 40% increase in high-level collaborative talk	Engagement serves as a mediating variable; authentic tasks promote social-cognitive engagement that drives learning gains.

RESULTS AND DISCUSSION

Results

The implementation of the Meaningful Based Learning innovation across two cycles yielded significant quantitative and qualitative improvements in student learning outcomes. Quantitative analysis of the pre-cycle and post-cycle learning tests revealed a statistically significant increase in the class average score. As detailed in Table 3, the mean score rose from 68.5 in the pre-cycle to 78.2 at the end of Cycle 1, and further to 83.7 at the end of Cycle 2, representing a substantial total gain of 15.2 points from baseline to final assessment. A paired-sample t-test confirmed that the improvement from pre-cycle to post-cycle was statistically significant ($t(23) = 8.74$, $p < 0.001$), indicating that the observed change was unlikely due to chance. Scores increased progressively across the two cycles, demonstrating a consistent positive trajectory following each round of reflective refinement. These findings indicate that the structured integration of real-world contexts was associated with measurable improvements in students' academic achievement across core subjects. The detailed results of students' learning outcomes across the pre-cycle, Cycle 1, and Cycle 2 are presented in Table 3.

Table 3. Comparison of Student Learning Outcome Test Scores (N=24)

Assessment Phase	Mean Score	Standard Deviation	Minimum Score	Maximum Score
Pre-Cycle	68.5	7.2	55	82
End of Cycle 1	78.2	6.5	65	88
End of Cycle 2	83.7	5.8	72	92

Qualitative data from observations and student interviews provided rich, descriptive evidence that deepened the understanding of the quantitative gains. Observation notes consistently recorded a marked increase in student engagement, collaboration, and persistence during real-world activities like the class market and garden project. Thematic analysis of interviews revealed a shift in student perception; they began describing learning as "fun," "useful," and connected to "what my mom does." For instance, Student C articulated, "Now I know math is for buying things and sharing snacks equally with friends," demonstrating a clear, personal connection to the abstract concept of division. Furthermore, analysis of student portfolios showed more detailed, accurate, and creatively presented work in Cycle 2 compared to Cycle 1, serving as tangible artifacts of deepened understanding. These qualitative strands collectively paint a picture of a classroom transformed from a place of passive reception to one of active, relevant knowledge construction.

Discussion

The Mechanism of Meaning: Connecting Abstract Concepts to Concrete Schemata

The quantitative leap in test scores, from a pre-cycle mean of 68.5 to a final mean of 83.7, provides strong empirical evidence for the cognitive efficacy of anchoring instruction in lived experience. This improvement is not merely statistical but reflects a deeper shift in how first-graders processed academic information, moving from fragile, rote-held facts to integrated, retrievable knowledge. The foundational mechanism for this shift is meaningful reception learning, a process where new concepts are deliberately linked to relevant, pre-existing concepts in the learner's cognitive structure, a principle central to constructivist theory (Novak, 2022). In this study, abstract mathematical symbols and literacy rules were subsumed into the children's rich schemata of daily routines such as shopping, sharing, and observing nature transforming alien academic content into familiar extensions of their world. This process of cognitive anchoring effectively bypasses the limitations of working memory in young children, allowing them to offload cognitive effort onto familiar mental models and focus on applying new rules within them.

When compared to similar Classroom Action Research (CAR) studies in Southeast Asian early education contexts, the magnitude of gain observed here (15.2 points) is notably robust. For instance, a project-based learning intervention in Indonesian first-grade classrooms reported a mean increase of 11.4 points (pre-cycle to post-cycle) over two cycles (Sari & Wijaya, 2021). Similarly, a contextual learning study in Malaysian primary schools (Year 1) found a gain of 9.7 points after a single cycle, with diminishing returns in the second cycle (Cahya et al., 2025). In Thailand, a place-based learning intervention with first graders yielded a 13.1-point increase, though the authors noted challenges in sustaining engagement beyond the novelty phase (Chaisri & Phanich, 2020). Our study's 15.2-point gain exceeds these regional benchmarks, potentially due to the deliberate integration of both simulated (class market) and authentic (garden project) real-world modules across two iterative cycles, which sustained engagement and allowed for targeted scaffolding. These comparisons suggest that the structured, cyclical refinement inherent in CAR can amplify the effectiveness of meaningful learning approaches beyond what is achieved in non-iterative designs.

The intervention's design explicitly operationalized this mechanism by creating bridging contexts that mirrored the students' real-world interactions. For instance, the pre-test showed that 18 out of 24 students (75%) could solve " $5 + 3$ " on a worksheet but could not apply it to a story problem about combining marbles. Post-intervention, the same application task saw success from 22 students (92%), demonstrating the transfer of skill from abstract to applied. This significant shift underscores that knowledge remained inert when stored as an isolated procedural fact but became active and applicable when linked to a concrete schema. Research by Smith (2021) corroborates this, finding that contextually embedded knowledge shows higher rates of retention and transfer because it is stored in a network of associated ideas, not in isolation. Therefore, the class market was not a mere motivational activity but a crucial cognitive scaffold that provided a ready-made mental "file" for storing and accessing arithmetic operations.

Further qualitative data from student interviews and portfolio artifacts reveals the depth of this cognitive integration. When asked how he solved a problem, one student explained, "I thought about when I was the seller and gave back money," directly verbalizing the retrieval of a personal, episodic memory to execute a mathematical procedure. This aligns with the concept of situated cognition, which posits that knowing is inseparable from the activity and context in which it is developed and used (Brown et al., 2022). The portfolios from Cycle 2, compared to Cycle 1, showed a marked increase in students' ability to create their own word problems based on class activities, indicating they had internalized the structure of the problems, not just the solutions. This evolution from executing procedures to generating context-based problems signifies a maturation from simple subsumption to the generative use of integrated knowledge.

Consequently, the core innovation of this study lies in its systematic engineering of the classroom environment to make the mechanism of meaningful learning not a chance occurrence but a predictable instructional outcome. By designing lessons that intentionally mapped curriculum objectives onto tangible, everyday experiences, the study ensured that subsumption had a high-probability pathway to occur for all learners. This deliberate design directly addresses the common pitfall of assuming young children will spontaneously make real-world connections; instead, the teacher must architect the conditions for those connections (Akram et al., 2022; Bahtiar & Fadhilah, 2021). Situating these findings within the broader Southeast Asian literature reinforces that meaningful learning innovations are most effective when they are contextually grounded, iteratively refined, and compared against realistic regional benchmarks (Cahya et al., 2026). The data, therefore, illustrate that improved learning outcomes were the direct product of a teaching methodology that strategically aligned with the natural way children build understanding through connection, context, and concrete experience.

Engagement as a Catalyst: Beyond Superficial Motivation to Deep Involvement

The quantitative and observational data converge to illustrate that the surge in engagement was a fundamental driver of cognitive gain, not a secondary byproduct. Structured observation metrics revealed that the average duration of focused, on-task behavior during real-world activities increased from 12 minutes in traditional lessons to 23 minutes, effectively doubling the productive learning time. This dramatic shift can be attributed to the generation of situational interest, a powerful form of motivation sparked by the novelty, challenge, and relevance of the environment (Jones & Lee, 2023). In activities like the class market, the interest was not just situational but authentic; students were not pretending to care about fake money, but were genuinely invested in the outcome of their transactions, as their goal was to "earn" enough to "purchase" a privilege like choosing the next storybook. This authentic stake in the outcome transformed passive attendees into active participants, creating a classroom dynamic where investment was intrinsic to the task design.

The depth of this involvement was qualitatively evidenced by the nature of peer interactions and problem-solving behaviors. Observational coding showed a 40% increase in

instances of high-level collaborative talk such as explaining reasoning, negotiating solutions, and asking clarifying questions compared to teacher-directed sessions. For example, during a garden measurement activity, students spontaneously debated whether to use a ruler or a string to measure the curved stem of a plant, demonstrating applied reasoning. This aligns with research positing that authentic tasks require and foster complex social-cognitive skills, as they mirror the collaborative nature of real-world problem-solving (George et al., 2024; Glazewski & Ertmer, 2020). The engagement observed was therefore not mere busyness but was characterized by cognitive engagement, where students were mentally manipulating ideas, and social engagement, where they were co-constructing understanding within a community of practice.

Consequently, this elevated and sustained engagement served as the essential catalyst that allowed the theoretical mechanism of meaningful learning to function optimally in practice. The extended time-on-task provided the necessary repeated exposures and iterations for new information to be securely linked to existing schemata. The high-quality peer interactions acted as live scaffolding, allowing students to test and refine their understanding through dialogue before internalizing it. This created the self-reinforcing cycle theorized by modern engagement models: initial situational interest led to deeper behavioral and cognitive involvement, which resulted in successful task completion and a sense of competence, thereby fueling further interest and willingness to engage with subsequent, more challenging tasks (Kan et al., 2024). Thus, the innovation's success was not just in making learning fun, but in architecting a learning ecology where engagement was the engine for durable knowledge construction.

The Iterative Refinement: How Action Research Amplified the Intervention's Impact

The significant score improvement from Cycle 1 ($M=78.2$) to Cycle 2 ($M=83.7$) cannot be attributed solely to the initial intervention but is a direct result of the iterative refinement process inherent to Classroom Action Research (CAR). The critical reflection phase after Cycle 1, utilizing triangulated data from observations, portfolios, and short student interviews, pinpointed a specific efficacy gap: approximately one-third of students (8 out of 24) showed high engagement but made procedural errors in multi-step tasks like calculating total cost and change in the market simulation. This diagnostic capability of CAR, which allows for real-time problem identification within the authentic teaching context, is a key strength over static pre-post designs (Kemmis et al., 2023). The decision to refine the intervention was thus data-driven, moving beyond a generic implementation to a targeted response addressing an observed stumbling block, demonstrating that effective innovation requires responsive adaptation.

The specific refinements implemented in Cycle 2 were theory-informed adjustments designed to provide more structured support. The introduction of visual flowcharts for the market simulation and the strategic pairing of students into "expert-novice" dyads were deliberate acts of scaffolding. These supports effectively mediated the task complexity, breaking it down into manageable steps and leveraging social learning, which is crucial for navigating the zone of proximal development in collaborative settings (Brown et al., 2022). Data from Cycle 2 observations showed a 60% reduction in procedural errors among the previously struggling students and a marked increase in the quality of peer explanations. This outcome underscores a vital pedagogical principle: the power of a learning context is unlocked not just by its authenticity, but by the clarity and support of its procedural framework, especially for young learners (Wilson & Chen, 2023).

Therefore, the CAR methodology itself was an integral component of the innovation's success, transforming it from a fixed "treatment" into a dynamic, self-optimizing pedagogical model. The cyclical process of planning, acting, observing, and reflecting created a feedback loop where the classroom's reality directly shaped the intervention's evolution, ensuring it remained responsive to learner needs. This responsive tailoring, evidenced by the rising scores and improved task execution, highlights that the fidelity of implementation in educational research should

include adaptability, not just strict adherence to an initial protocol (Garcia, 2022). Consequently, the study demonstrates that the most meaningful and impactful pedagogical innovations are often those developed *in situ* through iterative, reflective practice, where the researcher's willingness to learn from initial limitations becomes the key to achieving greater effectiveness.

Limitations and Future Research Directions

A primary limitation of this study is its contextual specificity, as the research was conducted within a single first-grade classroom (N=24) in one urban public school, which inherently restricts the generalizability of the findings. The purposive sample, while providing rich, in-depth data for this Classroom Action Research (CAR), means the results are deeply intertwined with the unique social dynamics, teacher style, and student backgrounds of this particular setting (Kemmis et al., 2023). Consequently, while the intervention proved highly effective here, its direct replicability in vastly different contexts such as rural schools or classrooms with significantly larger pupil-teacher ratios cannot be assumed without further validation. This limitation is common in deep qualitative and action research but necessitates caution when advocating for broad policy changes based on a single case. Future studies must therefore prioritize multi-site replications to distinguish between universally effective pedagogical principles and context-dependent implementation factors.

A second significant limitation concerns the study's temporal scope and the measurement of transfer. The intervention lasted two months across two CAR cycles, which is sufficient to demonstrate initial impact but insufficient to assess the long-term retention of gains or their application to novel, unrelated domains. Research on sustained conceptual change indicates that knowledge constructed in rich contexts is more durable, but its endurance needs verification over an academic year or across grade transitions (Smith, 2021). Furthermore, while portfolios showed application within the themed modules, we did not formally test far transfer whether the improved problem-solving skills aided performance in a standardized test or a completely different subject area. To address this, longitudinal cohort studies and research designs that include delayed post-tests and transfer tasks are essential next steps to evaluate the true staying power and flexibility of the learning fostered by this model (Jones & Lee, 2023).

The final and perhaps most pivotal direction for future research involves shifting focus from the innovation itself to the innovators the teachers. This study's success was facilitated by a teacher-researcher deeply invested in the CAR process, a scenario not representative of all classroom environments. The design and facilitation of meaningful, real-world modules require considerable pedagogical content knowledge, creativity, and classroom management skill. As Wilson & Chen (2023) argue, teacher capacity is the most critical bottleneck in scaling pedagogical innovation. Therefore, imperative future work must investigate effective professional development models such as coaching, collaborative design studios, or professional learning communities that can equip a wider range of teachers with the confidence and competence to implement this approach. Additionally, quasi-experimental designs comparing outcomes across classrooms with varying levels of teacher support will be crucial for building a scalable and sustainable framework for Meaningful Based Learning in diverse educational ecosystems.

CONCLUSION

This classroom action research suggests that the systematic integration of real-world contexts through a Meaningful Based Learning model can improve first-grade students' learning outcomes. The intervention, designed around authentic activities such as a class market and garden project, achieved its primary objective by producing a statistically significant increase in academic test scores, with the class mean rising from 68.5 to 83.7. More importantly, qualitative data revealed profound shifts in student engagement, cognitive processing, and the ability to articulate

the relevance of their learning. The evidence indicates that bridging the abstract-concrete divide for young learners is both possible and beneficial for fostering deep, applicable understanding. Accordingly, the study supports the hypothesis that bringing the real world into the first-grade classroom can serve as a powerful pedagogical strategy for enhancing holistic learning outcomes, though these findings are derived from a single-classroom context and require further validation.

Theoretically, this study provides empirical support for Ausubel's theory of meaningful learning and Vygotskian social constructivism within the specific context of early primary education. It helps elucidate the operational mechanismcognitive subsumption anchored to lived schemata through which contextual learning translates into improved performance. Furthermore, it highlights the critical role of sustained, cognitively rich engagement as the catalyst that enables this mechanism to function effectively. The iterative action research design itself contributes to methodological discourse, showcasing how reflective, cyclical refinement is integral to optimizing pedagogical innovations, moving beyond rigid, one-size-fits-all implementations. Collectively, these theoretical insights enrich the understanding of how young children construct knowledge, emphasizing the inseparability of context, cognition, and social interaction.

Practically, this research offers a potential replicable framework and a compelling case for first-grade teachers and curriculum developers to reorient their instructional design. The study provides concrete examples of thematic modules that align with standard curricula while making learning tangible and purpose-driven. For school administrators and policymakers, the findings argue for supporting professional development that equips teachers with the skills to create and manage such authentic learning environments, and for valuing assessment methods that capture applied understanding. The model presents a viable pathway to address student disengagement and superficial learning, advocating for investment in classroom resources and teacher training that prioritizes contextual, meaning-driven pedagogy over rote instructional methods.

Based on the acknowledged limitations of this study, several avenues for future research are proposed. First, quasi-experimental studies across multiple schools and diverse socio-economic contexts are needed to establish the model's external validity and generalizability. Second, longitudinal research is required to investigate the long-term retention of learning gains and the transferability of skills to new and unfamiliar domains. Finally, and most critically, subsequent research must focus on the teacher variable, investigating the most effective models of professional development, coaching, and support systems needed to scale this pedagogical innovation effectively. Addressing these areas will be crucial in transitioning Meaningful Based Learning from a successful pilot in a single classroom to a sustainable and transformative element of early childhood education systems.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Ajeng Tri Agustini: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Resources, Software, Validation, Visualization, Writing – Original Draft, Writing – Review & Editing.

Yeni Yuniarti: Conceptualization, Supervision, Validation, Writing – Review & Editing. Formal Analysis, Investigation, Resources, Software.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. This research was conducted independently as part of a classroom action research initiative for academic purposes, without any commercial or organizational support that could create a conflict of interest.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. Due to the sensitive nature of data involving minor participants (children aged 6–7 years) and ethical restrictions under IRB approval No. 127/UNIV/EC/2025, the anonymized dataset is not publicly archived. Still, it can be shared in a de-identified format for academic verification upon reasonable request and with appropriate data use agreements.

ETHICS STATEMENT

This study was conducted in accordance with the ethical standards of the Institutional Review Board (IRB) of Universitas Pendidikan Indonesia. Formal ethical approval was obtained under reference number 127/UNIV/EC/2025. The research involved human participants (first-grade students aged 6–7 years). Written informed consent was obtained from the parents or legal guardians of all 24 participating students, and verbal assent was obtained from the children in an age-appropriate manner. All data were anonymized to protect participant identities, and participation was voluntary with the right to withdraw at any time without consequence. No sensitive personal data beyond academic performance and basic demographics (age, gender, prior semester scores) was collected.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the author(s) used ChatGPT (OpenAI, GPT-4) and Grammarly (AI-assisted language tool) to improve language clarity and readability, assist with paraphrasing and rephrasing to achieve an appropriate academic tone, support the organization and structuring of selected sections of the introduction and discussion, and check grammar and punctuation consistency. The use of these tools was limited to language and writing support, while the authors remained fully responsible for the content, interpretation of the findings, and final version of the manuscript.

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