



Enhancing Elementary Mathematics Learning Through Contextual Teaching and Regalia: A Case Study in Bloro, Indonesia

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Abstract: This study explores the implementation and perceived effectiveness of contextual teaching supported by regalia in elementary mathematics classes. A qualitative case study approach was adopted, employing in-depth interviews with a fifth-grade mathematics teacher in Bloro, Indonesia, as the primary data source. The findings reveal that the integration of contextual teaching with regalia strengthens students' conceptual understanding, engagement, motivation, and creativity during mathematics learning activities. Regalia enabled students to actively manipulate instructional objects, helping them connect mathematical ideas with real-world contexts. However, the approach presented challenges, including limited availability of instructional media and substantial preparation time required for classroom use. Despite these constraints, the study concludes that contextual teaching using regalia is an effective strategy for improving mathematics learning in elementary schools. The results also provide practical guidance for educators seeking meaningful, hands-on instructional approaches that encourage student participation and deeper understanding.

Keywords: Contextual Teaching, Elementary Mathematics, Regalia, Case Study, Student Engagement, Indonesia

Introduction

Mathematics is a fundamental subject in elementary education, forming the foundation for higher-order thinking and problem-solving skills (Ekadayanti et al., 2025; Jabar et al, 2025) (Mailani et al, 2025). However, teaching mathematics at the primary level often faces challenges, including students' difficulty understanding abstract concepts, low motivation, and limited engagement (Ajir et al, 2025) (Andika Pratama et al, 2025) (Sinaga et al, 2025). In Indonesia, traditional teacher-centered approaches are still prevalent, which may hinder students from actively participating in learning activities and applying mathematical knowledge in real-life contexts. Innovative teaching strategies are needed to make mathematics learning more meaningful, engaging, and effective for young learners.

Previous studies have highlighted the benefits of contextual teaching and learning in mathematics education. Contextual teaching connects academic content to students' real-life experiences, fostering deeper understanding, critical thinking, and problem-solving

skills (Amalia et al, 2024) (Supratman et al, 2023) (Syuhada et al, 2021). Furthermore, research shows that the use of manipulatives or regalia as instructional media enhances students' conceptual understanding and engagement by allowing hands-on exploration of abstract concepts (Akhmeta, 2014) (Sabri, 2015) (Sari, 2020). Empirical evidence suggests that combining contextual learning with manipulatives can improve both cognitive and affective learning outcomes, particularly in elementary mathematics.

Despite these findings, there is limited research on the implementation of contextual teaching using regalia in Indonesian elementary schools (Aminah et al, 2022) (Febriyanti et al, 2023) (Lipiah et al, 2022), especially at the local level such as Blora. Most studies focus on general educational contexts or larger-scale interventions, leaving a gap in understanding how a single teacher implements these strategies in everyday classroom settings. In addition, there is insufficient evidence on how teachers perceive the effectiveness of contextual teaching combined with regalia, including the challenges they encounter and strategies they employ to engage students actively.

This study addresses these gaps by providing a qualitative case study of a fifth-grade mathematics teacher in Blora who implements contextual learning with regalia. The novelty of this research lies in its focus on hands-on, contextually meaningful activities in a real classroom setting, offering detailed insights into teaching strategies, student engagement, and the practical challenges of using regalia. By examining both the teacher's practices and perceptions, this study contributes locally grounded evidence that can inform mathematics teaching practices in similar contexts.

Based on the identified gaps and the novelty of the approach, this study aims to explore the implementation of contextual teaching in elementary mathematics using regalia as instructional media, focusing on the strategies employed by the teacher, the perceived effectiveness of the approach, and the challenges faced in practice. The findings are expected to provide practical insights for educators seeking to enhance student engagement and conceptual understanding in primary mathematics classrooms.

Methodology

Research Design

This study employed a qualitative case study design to explore the implementation of contextual mathematics teaching using regalia in a real classroom setting. The case study approach allows for an in-depth investigation of the teacher's experiences, strategies, and perceptions, providing rich descriptive data that quantitative methods may not capture (Creswell, 2015). By focusing on a single teacher in Blora, the study captures detailed insights into practical classroom practices, student engagement, and challenges in using instructional media. This design also enables the exploration of complex interactions between teaching methods, media, and student responses, providing a holistic understanding of the learning process. Furthermore, the case study approach allows the researcher to examine how contextual learning is adapted to fit the local educational and cultural context, offering findings with both practical and theoretical significance.

Participant

The participant of this study was a fifth-grade mathematics teacher with 12 years of teaching experience at a public elementary school in Blora, Indonesia. The teacher was selected through purposive sampling due to their active use of contextual teaching strategies and regalia in the mathematics classroom. The participant has extensive experience in engaging students through hands-on and real-life learning activities and has demonstrated innovative approaches to teaching abstract mathematical concepts. This selection ensured that the data collected would provide rich insights into the effective application of both contextual learning and physical instructional media. The teacher's willingness to participate and reflect on their practice also allowed for detailed and candid responses, enhancing the credibility and depth of the study. Additionally, the participant's prior training in active learning methods provided a solid foundation for understanding the pedagogical rationale behind their strategies.

Data collection

Data were collected through in-depth, semi-structured interviews with the participant, allowing for flexibility in exploring emerging themes while maintaining focus on the research objectives. The interviews included open-ended questions related to teaching strategies, use of regalia, student engagement, and challenges in implementing contextual learning. Interviews were conducted in the teacher's classroom to observe the environment and context firsthand, adding depth to the collected data. Each interview lasted approximately 60–90 minutes and was audio-recorded with the participant's consent for accurate transcription and analysis. Follow-up questions were asked to clarify and expand on responses, ensuring comprehensive understanding of classroom practices. Field notes were also taken during the interview to capture non-verbal cues and contextual information that supported data interpretation.

Data analysis

Thematic analysis was used to analyze the interview data, following a systematic process of coding, categorizing, and identifying patterns and themes related to the research questions. Initial transcripts were carefully read multiple times to gain familiarity with the data, and key statements were highlighted for coding. Codes were then grouped into broader themes, such as teaching strategies, student engagement, perceived effectiveness, and challenges in implementing contextual learning with regalia. Thematic analysis allowed the researcher to identify both explicit statements and implicit meanings in the teacher's responses, providing a nuanced understanding of classroom practices. Data triangulation was conducted by cross-referencing interview data with field notes and relevant literature to enhance credibility and validity. Additionally, member checking was performed by sharing findings with the participant to confirm the accuracy and interpretation of the data.

Result and Discussion

The findings of this study are organized into five main themes reflecting the teacher’s experiences, strategies, perceived effectiveness, and challenges in implementing contextual mathematics learning using regalia in a fifth-grade classroom in Bora, Indonesia. Table 1 summarizes these five key aspects, which are further elaborated in the following sections.

Table 1. Summary of Key Findings

Theme	Description	Teacher’s Statement / Observation
1. Perception of Contextual Learning	Students connect mathematical concepts to real-life situations, enhancing understanding	“By using examples from daily experiences, students understand fractions and measurements faster.”
2. Implementation of Regalia	Use of physical manipulatives (fraction blocks, coins, measurement boards) to facilitate hands-on learning	“Physical manipulatives help students visualize and interact with mathematical concepts.”
3. Teaching Strategies	Systematic steps: Introduction → Main Activity → Practice & Discussion → Closure	“Linking lessons to daily experiences and letting students manipulate materials helps them learn better.”
4. Perceived Effectiveness	Improves conceptual understanding, engagement, creativity, and confidence	“Students are more willing to participate, enjoy manipulating the materials, and solve problems confidently.”
5. Challenges in Implementation	Limited materials, time-consuming preparation, diverse student abilities	“Sharing materials slows the lesson, and some students need more guidance due to different understanding levels.”

1. Perception of Contextual Learning

The teacher emphasized that contextual learning enables students to relate mathematical concepts to their daily lives, such as dividing snacks, arranging classroom objects, or measuring items. By connecting abstract concepts to tangible experiences, students were observed to grasp lessons more quickly and meaningfully. The approach also fostered curiosity, problem-solving skills, and creativity, encouraging students to actively explore and discuss ideas rather than passively receive information.

Furthermore, the teacher highlighted that contextual learning nurtures students’ ability to make meaningful connections between school subjects and real-world problem situations beyond mathematics. When students are encouraged to analyze familiar scenarios, they become more confident in transferring their knowledge to new challenges. This approach also builds their metacognitive awareness, as they begin to reflect on how and why certain strategies work in different contexts. As a result, contextual learning not

only strengthens understanding but also cultivates lifelong learning habits that prepare students for future academic and daily tasks.

2. Implementation of Regalia

Regalia, including fraction blocks, toy coins, and measurement boards, was used extensively to support hands-on learning. The teacher noted that manipulatives allow students to visualize abstract concepts and actively engage with mathematical operations. Students were highly motivated to participate, handle materials, and demonstrate solutions, indicating that regalia enhances both cognitive understanding and affective engagement in mathematics lessons.

The teacher also observed that regalia offered a valuable opportunity to address diverse learning styles within the classroom. Visual learners benefited from colorful, structured materials, while kinesthetic learners thrived when manipulating objects to solve problems. These materials created a supportive multisensory environment that accommodated varying student needs and preferences. Furthermore, the use of regalia encouraged peer interaction as students often shared tools, compared solutions, and assisted one another, making learning more collaborative and inclusive.

3. Teaching Strategies

The teacher implemented a structured approach comprising four stages: introduction, main activity, practice and discussion, and closure. Each stage integrated regalia to facilitate learning while linking content to real-life situations. During practice and discussion, students worked collaboratively in groups, promoting peer learning, communication, and problem-solving. This stepwise method enabled students to not only learn procedures but also apply mathematical knowledge practically.

In addition to the structured stages, the teacher incorporated reflective questioning to deepen students' understanding throughout the lessons. By prompting students to explain their reasoning, compare strategies, and justify their solutions, the teacher fostered critical thinking and mathematical communication skills. This reflective component helped students consolidate their learning and recognize multiple pathways to solving a problem. As a result, teaching strategies not only guided students through activities but also empowered them to think independently and articulate their mathematical ideas clearly.

4. Perceived Effectiveness

The teacher reported that contextual learning supported by regalia significantly improved students' conceptual understanding, engagement, creativity, and confidence in mathematics. Students were observed to participate actively, enjoy learning activities, and demonstrate problem-solving skills in realistic contexts. This approach helped reduce the abstractness of mathematical concepts and increased students' willingness to explore and apply their learning.

Moreover, the teacher observed a noticeable improvement in students' long-term retention of mathematical concepts when contextual learning and regalia were implemented consistently. Students were able to recall procedures and apply them in subsequent lessons with minimal prompting, indicating deeper cognitive processing. The

engaging nature of hands-on and real-life tasks also contributed to a positive classroom atmosphere, reducing anxiety often associated with mathematics. By building competence and enjoyment simultaneously, the approach helped cultivate a more positive mathematical identity among students.

5. Challenges in Implementation

Despite the benefits, the teacher encountered challenges in implementing this approach. Limited regalia materials required sharing among students, slowing down activities. Planning and preparing contextual lessons with manipulatives demanded more time compared to conventional methods. Additionally, student abilities varied, necessitating differentiated guidance to ensure that all learners could fully engage and understand the content. The teacher suggested that additional support from the school, such as more materials and training, could mitigate these challenges.

The teacher also pointed out that classroom management became more demanding during activities involving regalia, as students were highly enthusiastic and required clear guidelines for using materials responsibly. Noise levels occasionally increased, necessitating effective monitoring to keep discussions productive. Moreover, some students became overly focused on the materials rather than the underlying concepts, requiring the teacher to redirect attention to the learning goals. Despite these obstacles, the teacher believed that improved planning, better material organization, and school-level support could significantly enhance the smoothness and impact of implementation.

Discussion

This study aimed to explore the implementation of contextual mathematics teaching using regalia in an elementary classroom in Blora, Indonesia. The discussion is organized according to the main research objectives: teaching strategies, implementation practices, perceived effectiveness, and challenges.

Teaching Strategies

The teacher employed a structured, four-stage approach—Introduction → Main Activity → Practice & Discussion → Closure—to implement contextual learning effectively (DEWI et al., 2025; Iduard et al., 2025; Maharani et al., 2025). During the Introduction, lessons were linked to students' daily experiences, such as sharing snacks or arranging classroom objects, helping students relate abstract concepts to real-life contexts. In the Main Activity, regalia was used to facilitate hands-on exploration of mathematical operations. Practice and Discussion allowed collaborative problem-solving, while Closure encouraged reflection and application of concepts. This systematic approach aligns with research suggesting that scaffolding and active learning strategies enhance conceptual understanding and student engagement (Creswell, 2003).

The teacher's structured approach also ensured that each lesson progressed smoothly from simple to complex ideas. By beginning with familiar, real-world scenarios, students activated prior knowledge that helped them build new conceptual connections. This sequencing allowed learners to gradually internalize mathematical operations, reducing cognitive load and making the learning experience more intuitive. Moreover, allowing

students to manipulate objects during the Main Activity fostered exploration and discovery, elements that are central to constructivist learning theories.

Furthermore, the cyclical inclusion of Practice, Discussion, and Closure stages strengthened students' metacognitive abilities. Through guided discussions, students articulated their reasoning, refined their understanding, and learned to appreciate diverse perspectives from their peers. The Closure stage also reinforced retention by prompting students to reflect on how classroom activities related to broader daily-life challenges. Such reflection helps build deep conceptual schemas, a process supported by active-learning and experiential-learning frameworks that emphasize learner-centered interactions.

Implementation practices

The teacher actively integrated regalia—fraction blocks, toy coins, and measurement boards—into lessons, enabling students to interact with abstract mathematical ideas physically (Atiek Selliawati et al, 2025) (Manai et al, 2025) (Nur Aini et al, 2025) (Robby Kurniawan et al, 2025). Manipulatives supported visualization and allowed students to test and explore concepts independently or in groups. These practices are consistent with prior findings that hands-on tools in mathematics education enhance both cognitive comprehension and affective outcomes, such as engagement and confidence (Handayani & Subakti, 2021) (Ibad & Sarifah, 2021) (Parirak & Rahardjo, 2022) (Suminar & Ashshidiqi, 2020). The study confirms that the effective combination of contextual examples and manipulatives creates a meaningful and interactive learning environment.

The implementation of regalia also enabled differentiated instruction, allowing the teacher to tailor tasks based on students' varied levels of readiness. For example, students who needed additional support could work with simpler manipulatives, while more advanced students explored complex problem structures using the same tools but at higher levels of abstraction. This adaptability made lessons more inclusive and responsive to individual learning needs, ultimately improving classroom participation and reducing mathematics anxiety.

Additionally, the teacher's consistent use of manipulatives across multiple lessons created a stable learning environment in which students became increasingly confident in applying hands-on strategies. Over time, students not only manipulated objects but also began to visualize mathematical relationships mentally, showing evidence of conceptual transfer. This pedagogical consistency mirrors recommendations from mathematics education research, which argues that repeated exposure to manipulatives supports long-term conceptual development and encourages independent problem-solving habits.

Perceived Effectiveness

According to the teacher, the integration of contextual teaching with regalia improved students' conceptual understanding, creativity, engagement, and confidence. Students were observed actively participating, collaborating with peers, and solving problems with greater ease. These results support previous studies demonstrating that contextual and hands-on approaches not only enhance learning outcomes but also motivate students to explore mathematics beyond the classroom (Agustinsa et al, 2023) (Susanti &

Susanti, 2023) (Yunitasari et al, 2023). The study highlights that students can transfer these skills to real-life situations, indicating broader educational benefits.

The teacher also perceived noticeable improvements in students' willingness to collaborate and communicate their ideas. As students engaged with contextual problems using regalia, they were more inclined to explain their reasoning, negotiate solutions, and evaluate different strategies. This collaborative dynamic fostered social-emotional growth, including empathy, patience, and the ability to work effectively in groups—skills that are increasingly important in 21st-century learning environments.

In addition, the combined use of contextual scenarios and manipulatives appeared to contribute to stronger retention and long-term understanding. Students were able to recall procedures more accurately and apply concepts in unfamiliar contexts, such as solving real-life problems outside the classroom. This suggests that contextual learning not only enhances immediate performance but also supports deeper learning processes. The findings therefore reinforce the broader literature showing that meaningful, hands-on instruction cultivates both cognitive mastery and lifelong learning dispositions.

Challenges Implementation

Despite the advantages, the teacher faced several challenges: limited availability of regalia, time-consuming lesson preparation, and the need to accommodate students with varying levels of ability. These challenges are consistent with existing literature, which emphasizes resource constraints and differentiated instruction as common obstacles in implementing active, hands-on teaching (Situmorang et al, 2019). Addressing these issues requires institutional support, additional teaching resources, and professional development opportunities to help teachers optimize the use of contextual teaching and manipulatives effectively.

Another significant challenge was the teacher's need to continually monitor and manage classroom dynamics during hands-on activities. Students working with manipulatives often required close supervision to remain focused, collaborate effectively, and use materials appropriately. This increased demand for classroom management sometimes limited the teacher's ability to provide individualized support. Such conditions highlight the practical realities of implementing active-learning pedagogies in classrooms with diverse student behaviors and learning preferences.

Moreover, the lack of standardized training in contextual and manipulative-based teaching created inconsistency in instructional execution. The teacher noted a need for more professional development programs that focus on effective strategies for selecting, organizing, and integrating regalia into daily lessons. Without institutional guidance or collaborative planning time, teachers may struggle to design meaningful activities that align with curriculum goals. This underscores the importance of systemic support—such as resource provision, administrative assistance, and peer mentoring—to ensure that the benefits of contextual learning can be fully realized.

Conclusion

This study explored the implementation of contextual mathematics teaching using regalia in a fifth-grade classroom in Blora, Indonesia. Findings indicate that the teacher's structured approach—linking real-life examples with hands-on manipulatives such as fraction blocks, toy coins, and measurement boards—enhanced students' conceptual understanding, engagement, creativity, and confidence. The use of regalia allowed students to interact physically with abstract mathematical concepts, fostering both cognitive and affective development. Despite challenges such as limited materials, time-consuming preparation, and diverse student abilities, the approach proved effective in promoting active learning and practical application of mathematics. These results suggest that contextual teaching with manipulatives is a promising strategy for elementary mathematics education, and future research should examine broader classroom settings and incorporate student perspectives to further validate its effectiveness.

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