

The Effect of The Contextual Teaching and Learning (CTL) Model on Grade IV Students' Science Learning Interest at SDN 133 Pekanbaru

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ABSTRACT

This study examines the effect of the Contextual Teaching and Learning (CTL) model on students' interest in learning Science and Social Studies (IPAS) in fourth grade at SD Negeri 133 Pekanbaru. This research employed a quantitative experimental approach with a one-group pre-test—post-test design. The population consists of 40 students, and all were selected as the sample using a saturated sampling technique. Data were collected using a Likert-scale questionnaire consisting of 20 items measuring students' interest in learning. The questionnaire was administered twice, namely before treatment (pre-test) and after treatment (post-test), to determine changes in students' learning interest after implementing the CTL model. Data analysis includes validity and reliability tests, a normality test using the Kolmogorov-Smirnov test, and hypothesis testing using a paired-samples t-test, with assistance from SPSS. The results indicate that all instrument items were valid and reliable, with a Cronbach's Alpha value of 0.970. The normality test indicates that the data were normally distributed (Sig. = 0.200 > 0.05). The hypothesis test reveals a significant effect of the CTL model on students' learning interest, with a significance value of 0.000 < 0.05. These findings underscore that the CTL model effectively enhances students' engagement and interest by connecting learning materials to real-life contexts. This study contributes to the development of innovative and meaningful learning strategies in elementary education.

Keywords: contextual teaching and learning, learning interest, IPAS, elementary education

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INTRODUCTION

Education constitutes a fundamental mechanism for fostering the holistic development of learners, encompassing cognitive, affective, and psychomotor domains. Through structured educational experiences, individuals are equipped to navigate environmental complexities and respond to the evolving demands of contemporary life. Beyond mere knowledge transmission, education functions as a strategic instrument for character formation and the enhancement of human capital. Therefore, instructional practices at the elementary level must be carefully designed to support students' developmental needs and establish a strong foundation for lifelong learning (Ernayeti, 2018; Suwartini & Ferryka, 2019).

Instructional activity represents a dynamic interaction between teachers and learners aimed at achieving predetermined educational objectives. Effective learning requires not only appropriate teaching strategies but also meaningful engagement that actively involves students in the learning process. In this regard, innovative, student-centered approaches are essential to replace conventional teacher-centered practices that often limit students' participation and interest (Nurani, 2020; Adrianis, 2019).

Learning, fundamentally, is a transformative process that changes knowledge, skills, and attitudes through interaction with the environment. Meaningful learning occurs when students are actively involved in constructing knowledge rather than passively receiving information. Consequently, the selection of appropriate instructional models plays a crucial role in promoting active participation and meaningful learning experiences (Kasmianti, 2021; Zulkifli, 2018).

One of the critical factors influencing learning success is students' interest. Students with high learning interest tend to demonstrate better attention, engagement, and motivation, which ultimately impact their learning outcomes. Conversely, low interest often leads to passive behavior and reduced comprehension. Therefore, fostering students' interest in learning is a fundamental challenge that must be addressed through effective instructional strategies (Helda & Harun, 2020; Mariyam, 2019).

At the elementary level, IPAS (Integrated Science and Social Studies) is designed to help students understand natural and social phenomena in an integrated manner. However, in practice, IPAS learning is often dominated by theoretical explanations and lacks contextual engagement, leading to low student participation and interest. This condition highlights the need for instructional models that can connect learning materials with students' real-life experiences (Simbolon et al., 2023; Riyanto & Sugiharto, 2026).

The Contextual Teaching and Learning (CTL) model is widely recognized as an effective approach that integrates academic content with real-world situations. Through contextual learning, students are encouraged to construct knowledge actively and meaningfully. Previous studies have consistently shown that CTL can improve learning outcomes across various subjects. Simbolon et al. (2023) found that CTL significantly improved students' learning outcomes in thematic learning at the elementary level. Similarly, Helda and Harun (2020) demonstrated that CTL enhances students' motivation and writing skills, while Nurani (2020) reported increased student activity and learning outcomes through CTL implementation.

In addition, the effectiveness of CTL has been identified across different learning domains. Mariyam (2019) showed improvements in reading skills, while Kasmianti (2021) found that CTL enhances students' conceptual understanding in mathematics. Likewise, Adrianis (2019) and Suwartini and Ferryka (2019) confirmed that CTL improves learning outcomes in social studies and thematic learning. Earlier studies by Ernayeti (2018) and Zulkifli (2018) also highlighted the effectiveness of CTL in enhancing students' learning outcomes through inquiry-based and contextual approaches.

Despite these consistent findings, most previous studies have focused primarily on learning outcomes, skills, or conceptual understanding rather than explicitly examining students' learning interests as the primary variable. Furthermore, in the post-pandemic educational context, students are still readjusting to face-to-face learning after prolonged online instruction, a shift that has significantly affected their engagement and motivation. Riyanto and Sugiharto (2026) emphasize that modern instructional approaches should not only improve cognitive outcomes but also foster creativity, critical thinking, and active engagement.

Unlike previous studies that predominantly focus on learning outcomes or specific subject-specific skills, this study examines students' interest in learning IPAS as an integrated subject at the elementary level. Additionally, this research was conducted in a post-pandemic learning context at SD Negeri 133 Pekanbaru, where students are still adapting to face-to-face instruction. This study also emphasizes the contextual implementation of CTL based on students' real-life environments, thereby providing a more localized and situational perspective. Therefore, the research novelty lies in its focus on learning interest, its application in integrated IPAS learning, and its relevance to post-pandemic educational recovery at the elementary level.

Based on these considerations, this study aims to examine the effect of the Contextual Teaching and Learning (CTL) model on fourth-grade students' learning interest in IPAS at SD Negeri 133 Pekanbaru. The research findings are expected to contribute to the development of more effective, contextually relevant instructional strategies to enhance students' engagement and interest in learning.

METHOD

This study employed a quantitative experimental approach to ascertain the effect of the Contextual Teaching and Learning (CTL) model on fourth-grade students' interest in IPAS at SD Negeri 133 Pekanbaru. The experimental framework adopted is the One Group Pre-test-Post-test Design, a pre-experimental configuration involving a single cohort without a comparison group, in which baseline measurements (pre-test) are administered prior to the intervention and subsequently contrasted with post-intervention

measurements (post-test). This design facilitates the examination of shifts in learners' interest following the implementation of the CTL model. Within the scope of this investigation, the CTL model is conceptualized as an instructional paradigm that situates academic content within authentic, real-world contexts. The implementation encompasses a series of learner-centered activities, including collaborative discussions, group-based tasks, exploratory inquiry, problem-solving engagements, and reflective practices.

To ensure clarity regarding the implementation of the CTL model, the intervention was conducted over four instructional meetings, each lasting one lesson hour, focusing on the topic "Parts of Plants" in IPAS. The learning process followed the core CTL syntax, namely: constructivism, inquiry, questioning, learning community, modeling, reflection, and authentic assessment. The structured implementation of the CTL model in each meeting is summarized in Table 2 below.

Table 1. Summary of CTL-Based Lesson Implementation (Simplified Lesson Plan)

Meetings	Learning Activities	Applied CTL Syntax
1	Introduction to plant parts through apperception and real-life questions; students identify prior knowledge and observe examples of plants	Constructivism, Questioning
2	Students conduct simple experiments using celery/flowers with colored water; group observation and discussion of results	Inquiry, Learning Community
3	Students analyze functions of plant parts based on experiment results; the teacher provides examples and conceptual reinforcement through visuals	Modeling, Inquiry
4	Students complete LKPD, reflect on learning experiences, and relate concepts to daily life; evaluation conducted	Reflection, Authentic Assessment

(Source: Researcher, 2026)

During instruction, as shown above, students actively observe real objects, conduct simple experiments, participate in group discussions, and reflect on their learning experiences. The teacher facilitates learning by connecting lesson content with students' real-life environments, consistent with CTL principles.

Meanwhile, interest in IPAS is operationally defined as an affective construct encompassing learners' sense of enjoyment, attraction, attentional focus, and active participation throughout the instructional process. The study was conducted in 2026, commencing in January and continuing until completion. The population comprised 40 fourth-grade students of SD Negeri 133 Pekanbaru, including 28 female and 12 male students. Given the relatively small population size, a saturated sampling technique (total sampling) was employed, in which the entire population was included as research participants. Data were collected using a structured questionnaire designed to measure students' learning interest, with a 20-item Likert-scale format. The instrument was systematically developed based on four principal indicators: enjoyment, attraction, attention, and student involvement in IPAS learning activities. The questionnaire was administered on two separate occasions: prior to the intervention (pre-test) to establish baseline levels of interest, and subsequent to the intervention (post-test) to capture any observable changes following the application of the CTL model.

Tabel 2. Blueprint of the Student Learning Interest Questionnaire

No	Indicators	Sub-Indicators	Item Numbers	Total
1	Enjoyment	Experiencing enjoyment during lesson introduction and motivational activities	1,2	2
		Feeling comfortable during context-based core learning activities	3,4	2
		Not experiencing boredom during the instructional process	5,6	2

No	Indicators	Sub-Indicators	Item Numbers	Total
2	Attraction	Interest in materials linked to real-life contexts	7,8	2
		Enthusiasm for participating in discussions and exploratory activities	9,10	2
		Interest in examples and modeling provided by the teacher	11,12	2
3	Attention	Maintaining focus during teacher explanations and reinforcement	13,14	2
		Attending to contextual learning activities	15,16	2
		Paying attention during the reflection and evaluation stages	17	1
4	Student Involvement	Active participation in discussions and group work	18	1
		Engagement in reflective learning activities	19	1
		Active involvement in assignments and evaluations	20	1
Total				20

(Source: Wa'alin et al., 2024:3)

At the initial stage, participants were administered a pre-test to assess their baseline level of interest in learning. Subsequently, the researcher implemented the CTL model throughout the IPAS instructional sessions. Upon completion of the intervention, a post-test was administered to assess any increase in students' interest in learning. Data analysis procedures encompassed instrument validation and reliability testing. Content validity was established through expert judgment, while construct validity was examined using the Product-Moment correlation technique with SPSS. Reliability analysis was conducted using Cronbach's Alpha, with a threshold criterion of $\alpha > 0.60$ indicating acceptable internal consistency. Normality of the data distribution was assessed using the Kolmogorov–Smirnov test, with a significance level of ≥ 0.05 indicating normal distribution. Hypothesis testing was performed using the Paired Sample t-test at a 5% significance level. If the significance value (Sig.) was less than 0.05, the null hypothesis (H_0) was rejected, and the alternative hypothesis (H_a) was accepted. Through these analytical procedures, the study aims to provide empirical evidence on the effect of the CTL model on fourth-grade students' interest in IPAS learning at SD Negeri 133 Pekanbaru.

RESULTS AND DISCUSSION

Instrument Testing

Instrument validity and reliability testing of the present study were conducted to ensure the measurement tool's accuracy and consistency. All questionnaire items were found to be valid, with moderate-to-very-high correlation coefficients, indicating that each item effectively represents the construct of students' learning interest.

Table 3. Reliability Test Results

Reliability Statics		Interpretation
Cronbach's Alpha	N Item	
0.970	20	Highly Reliable

(Source: Processed Research Data, 2025)

The reliability analysis yields a Cronbach's alpha of 0.970, indicating a very high level of internal consistency. This result confirms that the instrument is highly reliable and consistently measures students' learning interest in IPAS.

Assumption Testing

Prior to conducting hypothesis testing, prerequisite statistical assumptions were evaluated to determine the appropriateness of subsequent parametric analyses. In this study, the assumption tested concerned the normality of the data distribution. The normality test was performed using the Kolmogorov–Smirnov test in SPSS. The decision-making criterion states that data are considered normally distributed if the significance value (Sig.) is greater than or equal to 0.05, whereas values below 0.05 indicate non-normality.

Table 4. Normality Test Results

Normality Test			
	Statistic	df	Sig.
Pre-test	.085	40	.200*
Post-test	.085	40	.200*

(Source: Processed Research Data, 2025)

The results present that both pre-test and post-test data are normally distributed (Sig. = 0.200 > 0.05). This indicates that the data meet the assumptions required for parametric statistical analysis, allowing further testing with the paired-samples t-test.

Hypothesis Testing

Hypothesis testing was conducted using the Paired Samples t-test to examine the effect of the Contextual Teaching and Learning (CTL) model on students' learning interest. The results reveal a significance value of 0.000 ($p < 0.05$), indicating a statistically significant difference between pre-test and post-test scores.

Table 5. Hypothesis Test Results

Paired Samples Test								
Paired Differences								
		Std.		95% Confidence				
		Deviation		Interval of the				
				Difference				
	Mean		Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1								
Pre-test –	-10.725	.847	.134	-10.996	-10.454	-80.089	39	.000
Post-test								

(Source: Processed Research Data, 2025)

More importantly, the findings demonstrate a substantial increase in students' interest in learning following implementation of the CTL model, with a mean difference of 10.725 points. This improvement reflects a meaningful enhancement in students' engagement, attention, and participation during the learning process. This increase suggests that the CTL model successfully creates a more interactive and contextual learning environment, enabling students to connect learning materials with real-life experiences. As a result, students became more actively involved in discussions, experiments, and reflective activities. Based on a pedagogical perspective, these findings indicate that the CTL approach not only improves statistical outcomes but also enhances the quality of the learning experience. The shift from passive learning to active participation is evident in students' increased enthusiasm and involvement throughout the instructional process. However, the absence of a control group limits the ability to claim absolute causality, although the consistent increase in scores strongly indicates a positive effect of the CTL model on students' interest in learning.

In addition to statistical significance testing, effect size analysis was conducted using Cohen's *d* to determine the magnitude of the CTL model's effect on students' learning interest. The calculation is performed using the following formula:

$$d = \frac{\text{Mean Difference}}{\text{Standard Deviation}}$$

$$d = \frac{10.725}{0.847} = 12.66$$

The result reveals that Cohen's *d* is 12.66, exceeding the standard benchmark of 0.8 and indicating a large effect size. This finding underscores that implementing the Contextual Teaching and Learning (CTL) model not only produces statistically significant differences but also has a strong practical impact on students' interest in learning. Therefore, the CTL model can be considered effective in improving students' engagement in IPAS learning. However, the magnitude of this effect may be influenced by the relatively homogeneous sample and the absence of a control group in the research design.

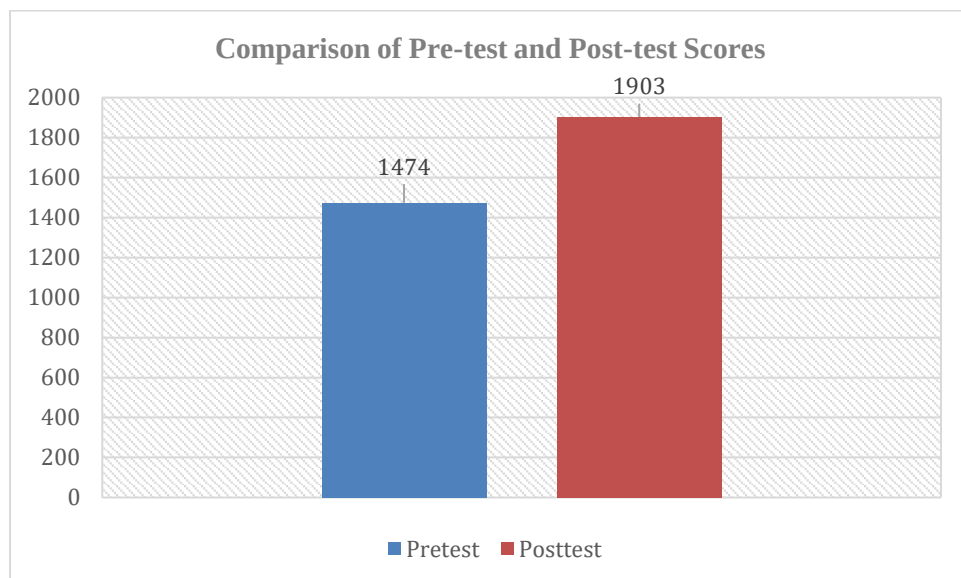


Figure 1. Comparison of Pre-test and Post-test Scores

Figure 1 compares pretest and posttest scores for students' learning interest in IPAS. Based on the data, the total pre-test score is 1474, and the total post-test score is 1903. This indicates a substantial improvement in students' interest in learning after the implementation of the Contextual Teaching and Learning (CTL) model. The difference between the two scores is 429 points, reflecting a meaningful increase in students' engagement and participation during the learning process. The higher post-test score indicates that students become more interested, attentive, and actively involved in IPAS learning following the CTL-based instruction. This finding supports the effectiveness of the CTL model in creating a more engaging and meaningful learning environment.

The research findings demonstrate that implementing the Contextual Teaching and Learning (CTL) model significantly enhances students' interest in IPAS learning. This result is supported by the significant difference between pre-test and post-test scores ($p < 0.05$), indicating that contextualized instruction effectively increases student engagement. However, rather than merely confirming previous findings, the

present study offers a more nuanced explanation by emphasizing that structured contextual activities and direct student involvement are the primary drivers of increased interest in learning.

From a theoretical perspective, contextual learning has long been recognized as an effective approach to connecting academic content with real-life situations (Glynn & Winter, 2004; Walz, 1989). Similarly, Granello (2000) highlighted that CTL promotes meaningful learning by situating knowledge within authentic contexts. In line with these perspectives, the present study confirms that contextualization enhances learning interest; however, it further reveals that the impact is significantly strengthened when contextual learning is combined with hands-on activities such as experiments, discussions, and reflection.

In contrast to Bax (2003), who argues that contextual approaches should replace traditional communicative methods, this study does not position CTL as a replacement but rather as a complementary strategy that becomes highly effective when systematically implemented through structured classroom activities. This indicates that the success of CTL depends not merely on contextual relevance but also on instructional design.

Furthermore, the research findings highlight the importance of active student participation in enhancing students' interest in learning. Previous research by Ellis and Collins (2009) emphasized the role of meaningful input and interaction in learning, while Barkhuizen (2008) underscored the importance of contextual narratives in shaping understanding. This study extends these ideas by demonstrating that active engagement through inquiry, collaboration, and reflection directly increases interest in learning, particularly in elementary IPAS learning.

This finding is further supported by Medriano Jr and Bautista (2020), who demonstrated that contextualized instruction enhances learner engagement by integrating real-life communication practices into the learning process. However, unlike their study, which focuses on language learning at the graduate level, the present study reveals that contextualization is equally effective at the elementary level, particularly when combined with hands-on and collaborative activities.

Another essential aspect emerging from this study is the role of instructional strategies in maintaining students' attention and engagement. Research on technology integration suggests that student engagement is influenced not merely by tools but also by how they are used pedagogically (Backfisch et al., 2021; Nelson et al., 2019). Studies by Almekhlafi and Almqdadi (2010) and Li et al. (2019) even indicate that excessive reliance on technology does not necessarily improve interaction. In contrast, this study reveals that even without heavy reliance on advanced technology, the CTL model can significantly enhance engagement through direct interaction, real objects, and experiential learning. This finding indicates that the pedagogical approach is more critical than technological sophistication in fostering interest in learning.

This finding also differs from studies focusing on ICT-based learning environments (Nhu et al., 2019; Ulla et al., 2020; Nuncio, 2020), which highlight challenges such as limited infrastructure and teacher readiness. Unlike those contexts, this study demonstrates that meaningful learning can still be achieved in low-technology settings through contextual and interactive teaching strategies.

In addition, the research results align with Haryanto and Arty (2019), who found that CTL improves higher-order thinking skills (HOTS) and self-efficacy. However, this study specifically emphasizes the affective dimension of learning interest as the primary outcome, indicating that increased interest may serve as a foundational factor that subsequently supports cognitive development.

The findings also resonate with recent discussions on post-pandemic education, where teachers' instructional practices have shifted significantly (Winter et al., 2021). Technology integration, as discussed by Habibi et al. (2020) and Zhang and Aslan (2021), plays a crucial role in modern education. Nevertheless, this study highlights that meaningful learning does not depend solely on digital tools; rather, it depends on how effectively teachers connect learning content to students' real-life experiences. This reinforces the idea that contextual pedagogy remains relevant even in technologically evolving educational environments.

Moreover, while studies such as Caldwell (2018) and Ulla et al. (2021) emphasized students' positive perceptions of technology-enhanced learning, this study demonstrates that direct experiential learning, such

as observing plants and conducting simple experiments, can yield equally strong or even more meaningful engagement, particularly for elementary students.

In summary, this study not only confirms the effectiveness of the CTL model but also provides a deeper understanding of the mechanisms underlying its success. Unlike previous studies that primarily focus on contextual content or technological integration, this research highlights that the combination of contextual relevance, structured learning activities, and active student participation is the key factor driving increased interest in learning. Therefore, the CTL model can be considered a highly effective pedagogical approach, particularly in elementary education contexts where experiential and meaningful learning are essential.

CONCLUSIONS AND RECOMMENDATION

In light of the empirical findings, the Contextual Teaching and Learning (CTL) model has a statistically significant effect on fourth-grade students' interest in IPAS at SD Negeri 133 Pekanbaru. This inference is substantiated by the results of the Paired Samples *t*-test, which yields a *p*-value of 0.000, well below the conventional threshold of 0.05. Consequently, the alternative hypothesis (H_a) is accepted, whereas the null hypothesis (H_0) is rejected. The implementation of the CTL model demonstrably enhances students' interest in learning, as evidenced by the difference between pre- and post-test scores. This pedagogical model facilitates the provision of meaningful learning experiences by embedding instructional content within learners' real-life materials. Such contextualization engenders heightened levels of engagement, attentiveness, and intrinsic interest among learners throughout the instructional process. Accordingly, the CTL model may be regarded as a viable and efficacious instructional alternative for augmenting students' interest in IPAS at the elementary education level.

Based on the research findings, several recommendations are advanced. First, educators are encouraged to optimize the implementation of the CTL model to foster greater student activity and a more motivational disposition. Second, educational institutions are expected to provide adequate infrastructural and pedagogical support to facilitate the integration of innovative instructional models. Third, future researchers are advised to extend the scope of inquiry by incorporating additional variables, such as academic achievement and higher-order thinking skills, to yield a more comprehensive understanding of the model.

Limitation

Notwithstanding its contributions, the present study is subject to several limitations that warrant consideration. First, the sample size was relatively constrained, comprising only 40 students from a single educational institution, thereby limiting the generalizability of the findings. Second, the investigation was confined to a single dependent variable, namely students' learning interest, thereby precluding a more holistic examination of the CTL model on other dimensions, such as academic performance or critical thinking skills. Third, the reliance on self-reported questionnaire data introduces the potential for subjectivity and response bias. In view of these limitations, subsequent studies are encouraged to incorporate larger, more diverse samples and employ a range of data collection techniques to enhance the robustness and comprehensiveness of the findings. Fourth, the study employed a one-group pre-test—post-test design without a control group, which poses a threat to internal validity. In the absence of a comparison group, it is not possible to attribute observed changes in students' learning interest solely to the CTL intervention with absolute certainty. Several confounding variables, such as maturation, history, and testing effects, may have influenced the outcomes. The decision not to include a control group was based on practical and administrative constraints within the school context, including limited classroom availability and the necessity to maintain instructional stability.

Credit Authorship Contribution Statement

First Author (Lusi Octaviana): Conceptualization, Methodology, Formal Analysis, Data Curation, Writing – Original Draft. Second Author (Muhamad Nukman): Supervision, Validation, Methodology, Writing – Review & Editing.

Declaration of Competing Interest

The authors hereby declare that there are no financial interests or personal relationships that could have inappropriately influenced the findings of this study.

Ethical Declaration

All participants provide informed consent prior to their involvement in this study. They were duly apprised of the research objectives, procedural protocols, and their right to withdraw from the study at any point without any adverse consequences.

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