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The Impact of the REACT Learning Model on Students Activity and Academic Performance

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Abstract: Student participation and achievement in geography learning are often low due to limited use of contextual learning approaches. This study aimed to improve students learning activity and academic performance in Geography among tenth-grade students at Senior High School 1 Kampar through the REACT (Relating, Experiencing, Applying, Cooperating, Transferring) learning model. The study employed a classroom action research design conducted in three cycles, each consisting of planning, implementation, observation, and reflection. The participants were 38 students in the 2024/2025 academic year. Data were collected through observation sheets and achievement tests and analyzed descriptively with a paired sample t-test. The findings showed that student activity scores increased from 64.2 in Cycle I to 88.4 in Cycle III, and learning outcomes improved from 67.5 to 89.6, with significant differences across cycles ($p < 0.05$). These results demonstrate that the REACT model effectively enhances students' engagement and academic performance. The implication of this study is that the REACT model can serve as an effective pedagogical strategy to promote active, contextual, and meaningful learning in geography education and other related disciplines.

Keywords: Geography Learning; Learning Activities; Learning Outcomes; REACT Model

Introduction

Geography education plays a crucial role in shaping students spatial reasoning, environmental awareness, and analytical ability to understand interactions between physical and human systems on Earth (Loder, 2025; Noura et al., 2025). Beyond knowledge acquisition, geography aims to develop critical thinking, problem solving, and social responsibility through contextual understanding of real-world phenomena (Indika et al., 2023; Prasetyo etal., 2025; Wu, Chen, & Chen, 2025). However, traditional classroom practices in many Indonesian high schools, including Senior High School 1 Kampar, remain dominated by teacher centered instruction. Students tend to be passive, dependent on explanations from the teacher, and have difficulty linking theoretical concepts to local environmental issues (Awuah et al., 2024; Padli et al., 2024; Prasetyo e al., 2024). This learning condition results in low participation and achievement levels that fail to meet the Minimum Mastery Criteria (KKM), highlighting a pedagogical gap between expected learning outcomes and actual classroom performance.

Recent developments in educational research emphasize the importance of contextual and student centered learning models to improve engagement and learning outcomes (Tasmant et al., 2025). Constructivist based approaches such as Project Based Learning (Kamil et al., 2023), Cooperative Learning (M Anwar et al., 2024; Muhammad Anwar & Sabrina, 2020), and Inquiry Based Learning (Mendoza et al., 2025) have been widely applied to foster active participation and deeper understanding. While these methods show promising results, their implementation often lacks integrative stages that connect students' experiences with new knowledge and facilitate the transfer of learning to different contexts (Hidayat et al., 2025; Jasmanedi et al., 2025; Nyoman et al., 2024; Prasetyo et al., 2024). As a result, many students struggle to apply classroom concepts to real life situations, especially in geography, where contextual interpretation is essential.

The REACT learning model, developed by the Center for Occupational Research and Development

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(CORD), presents a comprehensive framework that addresses this challenge through five interconnected components: Relating, Experiencing, Applying, Cooperating, and Transferring. This model emphasizes experiential and reflective learning, allowing students to construct knowledge meaningfully through collaboration and contextual application (Tasmant et al., 2025). Previous studies have confirmed its effectiveness in various subjects. For example, Kamil et al (2023) found that the REACT model increased student participation in social studies by 24%, while Salvifah (2021) reported improvements in students' critical thinking and conceptual understanding in science learning. Furthermore, Izzah & Arifin (2024) demonstrated that a REACT based contextual approach enhanced spatial understanding in geography. Despite these positive outcomes, empirical research examining the application of the REACT model in geography learning at the high school level particularly in Indonesia remains limited.

This limitation indicates a need for further exploration of how the REACT model can be effectively implemented in geography classrooms to promote both behavioral engagement and academic achievement. Prior studies have mostly focused on cognitive improvement, overlooking the simultaneous development of student activity and participation. In addition, few studies have used an action research framework to iteratively evaluate the impact of REACT implementation in authentic classroom settings (Abedi et al., 2025; Achmad & Sandy, 2024; Alatawi, 2025; Fokides & Antonopoulos, 2024). Thus, there is a research gap concerning how contextual and collaborative learning principles in the REACT model influence learning outcomes in geography.

To fill this gap, the present study aims to examine the impact of the REACT learning model on students' learning activity and academic performance in geography at Senior High School 1 Kampar. The novelty of this research lies in applying the REACT model within the Classroom Action Research (CAR) framework, allowing continuous reflection and improvement across multiple learning cycles. This approach provides empirical evidence of the model's effectiveness while offering practical insights for educators to design active, meaningful, and context-based geography learning. The scope of this research focuses on tenth-grade students during the 2024/2025 academic year, addressing both cognitive and behavioral dimensions of learning to advance innovative practices in geography education.

Method

Research Design

This study employed a Classroom Action Research (CAR) design, which emphasizes iterative reflection and improvement in teaching practices to enhance learning outcomes (Perdana et al., 2025). The CAR framework consists of four cyclical stages: planning, acting, observing, and reflecting, implemented across three cycles. This design allows researchers to continuously identify learning problems, test interventions, and evaluate their impact in authentic classroom settings. The use of CAR is particularly relevant in education research as it bridges the gap between theory and practice while engaging teachers as active collaborators in the research process (Selviani, Prasetyo, et al., 2024). The REACT learning model comprising Relating, Experiencing, Applying, Cooperating, and Transferring was integrated into each cycle to promote contextual, experiential, and student-centered learning (Kabir et al., 2025)

Research Subjects

The participants consisted of 38 tenth-grade students (20 males and 18 females) from Class X Phase E1 at Senior High School 1 Kampar, located in Kampar Regency, Riau Province, Indonesia. The participants were selected using a purposive sampling approach, as they were part of a class identified by the geography teacher as having low engagement and suboptimal learning outcomes in previous assessments. The study was conducted during the second semester of the 2024/2025 academic year. All participants were involved in every stage of the intervention, including planning, implementation, and reflection activities. Ethical considerations were maintained throughout the research, ensuring that participation was voluntary and that data confidentiality was preserved according to educational research standards (Ilham et al., 2024; Price, et al., 2025)

Materials and Instruments

The study utilized two primary instruments to collect data: an Observation Sheet of Student Learning Activity and a Learning Achievement Test.

1. Observation Sheet: Adapted from indicators of classroom engagement proposed by (Dzakiyyah et al., 2025; Sari et al., 2023; Selviani et al., 2023), the observation sheet assessed five domains: participation in group discussions, initiative in asking or answering questions, cooperation during group work, task completion accuracy, and contribution to concluding activities. Each item was rated using a five-point Likert scale ranging from "very low" to "very high."
2. Achievement Test: A 25-item multiple-choice test was developed based on the Geography core competencies and learning indicators established by the Indonesian Ministry of Education. The test items were designed to assess students' conceptual understanding and application of geographic

principles. Content validity was ensured through expert review by two university lecturers and one senior geography teacher, following procedures recommended (Dzakiyyah et al., 2025; Sari et al., 2023; Selviani et al., 2024)

Sample Preparation

Prior to data collection, both research instruments were piloted and validated. The observation sheet was pre-tested during a preliminary session to ensure clarity and inter-rater reliability. Two independent raters were trained to assess student activity consistently, and reliability coefficients exceeding 0.80 were considered acceptable (Sari et al., 2023). Similarly, the achievement test was analyzed for difficulty index and discrimination power using item analysis procedures, and only items meeting the acceptable range (0.3–0.8) were retained. Learning materials such as lesson plans, student worksheets, and teaching media were prepared following the REACT learning stages. These materials emphasized the linkage between geographic concepts and real-world contexts to facilitate contextual understanding (Julianna et al., 2025; Padavala et al., 2025)

Experimental Setup

The intervention was implemented over three learning cycles, each comprising five phases as shown in Figure 1:

1. Identify initial problems
2. Planning: The teacher and researcher collaboratively developed lesson plans incorporating REACT components, prepared instructional media, and scheduled observation and assessment procedures.
3. Acting: The REACT model was applied in the classroom. The teacher introduced geographic concepts through real-life examples (Relating), guided hands-on exploration (Experiencing), facilitated practical problem-solving (Applying), promoted group collaboration (Cooperating), and encouraged knowledge transfer to new contexts (Transferring).
4. Observing: The researchers systematically recorded students' learning behaviors using observation sheets and collected feedback from classroom discussions.
5. Reflecting: The team evaluated the results of each cycle, identifying challenges and refining the instructional design for subsequent cycles.

Each cycle consisted of two class meetings (2 × 45 minutes per session), resulting in six meetings over the semester. The iterative design enabled continuous refinement of teaching strategies to improve both student activity and achievement (Qi et al., 2025)

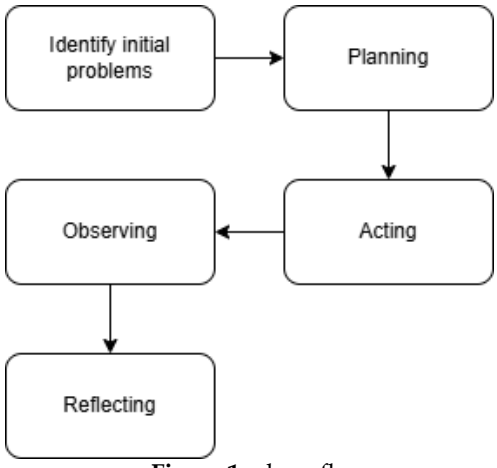

Figure 1. phase flow

Data Analysis Methods

Data were analyzed using both descriptive and inferential statistical techniques. Quantitative data on learning activity were summarized using mean scores and categorized into five levels (very low, low, moderate, high, and very high) following the classification by (Leite et al.,2025). Learning achievement data were analyzed by calculating average test scores and the percentage of students achieving the Minimum Mastery Criteria (≥ 75). To determine the significance of improvement across cycles, a paired sample t-test was performed using SPSS version 25, with a significance level of $p < 0.05$. Qualitative observations from reflection notes and classroom interactions were also analyzed to contextualize the quantitative findings, ensuring triangulation of data sources. This mixed analytical approach provides both statistical rigor and interpretative depth, consistent with best practices in educational action research (Khais et al., 2025)

Result and Discussion

The classroom action research was implemented in three consecutive cycles, each consisting of planning, implementation, observation, and reflection phases. The intervention aimed to improve students' learning activity and academic performance in geography through the REACT learning model. Data were obtained from observation sheets assessing student participation and from achievement tests administered at the end of each cycle.

Improvement in Students' Learning Activity

Students' learning activity was measured using five indicators: (1) participation in group discussions, (2) initiative in asking and answering questions, (3) collaboration during group work, (4) task completion accuracy, and (5) involvement in concluding activities. The mean activity scores for each cycle are presented below.

Table 1. Mean Scores of Student Learning Activity per Cycle

Cycle	Number of Students	Mean Score	Category
Pre-cycle	38	57.6	Moderate
Cycle I	38	64.2	Fairly High
Cycle II	38	77.8	High
Cycle III	38	88.4	Very High

As shown in Table 1, students learning activity consistently improved throughout the intervention. The mean score increased from 57.6 (Moderate) during the pre-cycle to 88.4 (Very High) in Cycle III, representing an improvement of 30.8 points or approximately 53.5%.

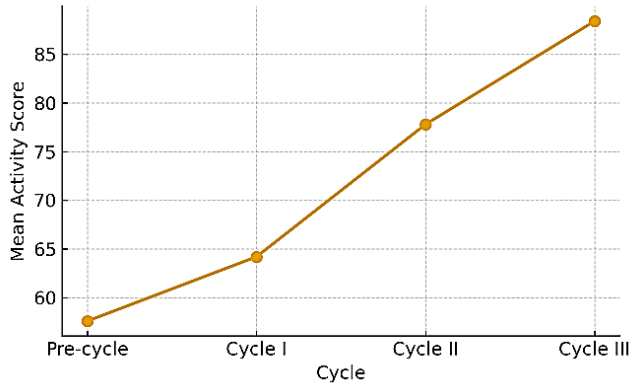

Figure 2. Trend of Student Learning Activity Across Cycles

The figure 2 shows a steady upward trend in learning activity. Students became increasingly active, collaborative, and able to relate geographic concepts to real-world contexts across the cycles.

Improvement in Students' Learning Achievement

Students academic performance was evaluated using multiple-choice tests administered after each cycle. The results are summarized below.

Table 2. Mean Scores of Student Learning Achievement per Cycle

Cycle	Mean Score	Mastery Percentage (≥ 75)	Category
Pre-cycle	67.5	36.8%	Not Yet Achieved
Cycle I	76.3	68.4%	Beginning to Achieve
Cycle II	83.7	84.2%	Achieved
Cycle III	89.6	94.7%	Fully Achieved

Base on Table 2 The data reveal a continuous improvement in students' test performance. The mean score increased from 67.5 in the pre-cycle to 89.6 in Cycle III, representing a 22.1-point increase (32.7%).

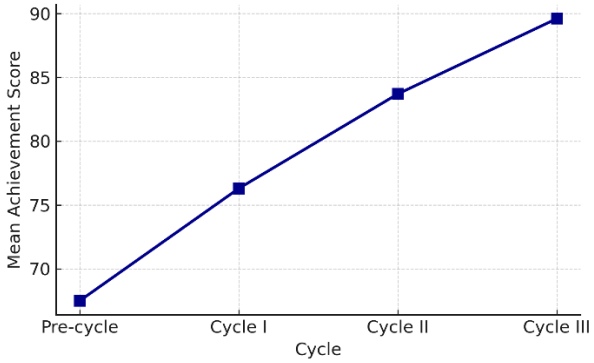

Figure 3. Progression of Students' Learning Achievement Across Cycles

From figure 3 The steady improvement in learning outcomes suggests that the REACT learning model effectively facilitated conceptual understanding and application of geographic concepts.

Table 3. Summary of Key Results

Indicator	Pre-cycle	Cycle I	Cycle II	Cycle III	% Increase
Mean Activity Score	57.6	64.2	77.8	88.4	+53.5%
Mean Achievement Score	67.5	76.3	83.7	89.6	+32.7%
Mastery (%)	36.8	68.4	84.2	94.7	+57.9%

As shown in Table 3, the findings demonstrate a strong correlation between the application of the REACT model and the improvement of student learning behavior and academic achievement. The increase in both behavioral and cognitive indicators provides empirical support for the effectiveness of contextual, student centered learning approaches in geography education.

The findings of this study provide clear evidence that the implementation of the REACT learning model effectively improves both students' learning activity and academic performance in geography. These results directly answer the research question, demonstrating that contextual, experiential, and collaborative learning strategies embedded in the REACT model lead to measurable improvements in student engagement and achievement. The study contributes new insights into how iterative application of the REACT model within a classroom action research framework can enhance conceptual understanding and active participation simultaneously an area that has received limited attention in previous geography education research (Elendu et al., 2025; Selviani et al., 2024).

The improvement in learning activity across the three cycles indicates that students became more engaged, confident, and collaborative as they progressed through the REACT learning stages. This pattern aligns with findings from (Hashemian &

Derakhshanfard, 2025; Kim et al., 2025), who reported increased participation in social studies classes following the use of REACT. However, the present study extends their conclusions by showing a more substantial and consistent increase in learning activity, rising from moderate to very high levels by Cycle III. This suggests that the integration of REACT within an iterative action research design may offer greater adaptability and responsiveness to student needs compared to single-implementation studies.

Similarly, the significant increase in students' academic performance supports the effectiveness of contextual and experiential learning approaches in facilitating conceptual understanding. The rise in mean test scores and mastery levels is consistent with the work of (Yorke et al., 2025), who found that REACT enhanced critical thinking and conceptual mastery in science learning. Nonetheless, the achievement gains observed in this study were more pronounced, particularly by the final cycle, indicating that geography due to its inherently contextual and spatial nature may benefit even more from REACT-based instruction. This strengthens the argument that the REACT model is highly suitable for subjects requiring the integration of real world phenomena and abstract concepts (Aufenanger et al., 2025; Ravindiran et al., 2025).

Compared with previous research, the present study offers several advantages (Alqahtani et al., 2025; Chang et al., 2025; Wang et al., 2025). First, it examines both behavioral (learning activity) and cognitive (academic performance) outcomes simultaneously, whereas many earlier studies have focused on one dimension only. Second, the study employs repeated cycles of implementation and reflection, allowing refinement of instructional strategies and providing more robust evidence of the model's effectiveness. Third, the integration of local environmental issues such as land use change and seasonal flooding into the Relating and Applying stages contributed to deeper student engagement and conceptual understanding, representing an innovative contextual adaptation of REACT in geography (Mirindi et al., 2025; Shao et al., 2025).

The significance of these findings lies in their practical implications for geography education. By demonstrating that students learn more effectively when they relate material to their lived experiences, collaborate with peers, and apply concepts to real-world contexts, this study reinforces the importance of student-centered and contextual pedagogical approaches in secondary education (Partini, 2023; Sari et al., 2025). The results suggest that the REACT model can be adopted as a viable strategy for improving learning outcomes in other concept-heavy or context-dependent subjects.

The research objectives were successfully achieved, as both learning activity and academic performance improved significantly across cycles. No major contradictory or unexplained results were observed; however, some variations in individual student participation were noted, particularly during early cycles, which may reflect differences in learning readiness or confidence levels. These variations diminished over time, suggesting that continued exposure to REACT may help stabilize participation across diverse learners.

Overall, the study provides coherent evidence that applying the REACT learning model through a structured action research framework leads to substantial improvements in geography learning. It advances current knowledge by demonstrating how contextual, experiential, and collaborative learning interact to support both engagement and achievement. The implications extend beyond geography, offering a model for enhancing active learning and conceptual mastery in various educational settings.

Conclusion

This study concludes that the implementation of the REACT learning model significantly improves student learning activity and academic performance in high school geography, as demonstrated through consistent increases in engagement, collaboration, and conceptual understanding across three classroom action research cycles, confirming that contextual, experiential, and cooperative learning strategies effectively address passive participation and low achievement commonly associated with traditional instruction; moreover, by providing empirical evidence of REACT's effectiveness within a classroom action research framework, this study contributes to the literature and highlights the model's potential for broader application in disciplines requiring contextual understanding and active learner involvement, while also suggesting directions for future research, including its integration into digital or hybrid learning environments, examination of long-term learning retention, and analysis of its impact on higher-order thinking skills, thereby offering a practical and evidence-based approach for enhancing geography education and related fields.

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Author Contributions

Conceptualization, S.H.; methodology, S.H. and E.; formal analysis, S.H.; investigation, S.H. and D.H.; resources, E.; data curation, S.H.; writing original draft preparation, S.H.; writing review and editing, E. and D.H.; supervision, D.H. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest
The authors declare no conflict of interest.

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