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The Effect of Differentiated Instruction on Students' Learning Activeness in Regions and Natural Resources

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ABSTRACT

Objective: This study aims to examine the effect of the differentiated instruction approach in elementary schools on the level of learning activeness of fourth-grade students in the topic of Regions and Natural Resources in Natural Science and Social. **Method:** This study employed a quantitative, quasi-experimental design with an experimental class implementing differentiated instruction and a control class using conventional teaching methods. Data were collected through observation, documentation, and a learning activeness questionnaire that had been tested for validity and reliability, with a Cronbach's alpha value of 0.760. **Results:** The results of the independent samples t-test showed a significance value of < 0.001 , indicating a significant effect of implementing differentiated instruction on students' learning activeness. The findings demonstrate that this approach improves students' participation, concentration, and cooperation during the learning process. **Novelty:** This study focuses on the implementation of differentiated instruction in a fourth-grade primary school classroom, specifically addressing the topic of "Regions and Natural Resources"—a subject that has received limited attention in previous research. The study's novelty lies in its examination of whether the government-promoted differentiated approach actually proves effective, particularly regarding the specific focus area in question.

INTRODUCTION

Student learning activeness is one of the key indicators determining the success of the learning process in elementary schools. This is consistent with the Regulation of the Minister of Education and Culture (Permendikbud) No. 16 of 2022, Article 9 (1), which states that the learning process should motivate students to participate actively. Learning activeness refers to the efforts made by students when engaging in learning activities (Putri et al., 2019). To achieve optimal learning outcomes, it is essential to create a conducive learning environment that encourages students to be physically, mentally, and emotionally involved in teaching and learning activities, such as asking questions, participating in discussions, answering questions, and actively engaging in various learning activities.

The diversity of students in today's classrooms continues to increase, requiring teachers to implement differentiated instruction to create an effective learning process (Karmila et al., 2024). Indonesia is widely recognized as a multicultural country with diverse socio-cultural values, which presents significant challenges in achieving national integration (Sukardi et al., 2025). Differences are not only found at the national level but also within schools, such as variations in students' learning styles. In line with this, the government expects teachers to implement differentiated instruction. The Decree of the Minister of Education and Culture Number 719/P/2020 also explains that active learning should encourage students to genuinely engage in the learning process by understanding how they learn independently, reflecting on their learning experiences, and developing



a growth mindset. When students are actively involved, they become more connected to the learning process, which in turn motivates them to continue learning.

Based on the results of preliminary observations and interviews with the fourth-grade teacher conducted on April 23–26, 2025, at Ciseupan Girang Elementary School, several problems related to students' learning activeness were identified. The teacher stated during the interview: *"There are still some students who daydream or talk with their friends during lessons and are not focused. When they are asked questions, they remain silent and appear confused because they were not paying attention to the lesson."*

Classroom observations in the fourth-grade Social Studies subject showed that students were not actively involved in the learning process. During learning activities, only 23% of students demonstrated willingness to participate actively, such as asking questions, answering voluntarily, and engaging in discussions or classroom activities without being prompted. Meanwhile, 25% of students appeared indifferent, paid little attention, and did not respond during the learning process. In addition, 53% of students were passive during the lesson; they only became active when directly prompted by the teacher and showed no initiative.

The results of the students' daily assessments also indicated that 76% of the students achieved the Minimum Mastery Criteria (Kriteria Ketuntasan Minimal, KKM), while 24% remained below the criteria. Students often appear reluctant to respond to the teacher's questions because they are afraid of making mistakes or worried about being teased by their classmates. This indicates that the classroom atmosphere has not yet fully supported an inclusive and supportive learning environment (Winata, 2025). A less supportive emotional environment may cause students to feel pressured, anxious, or unmotivated to participate actively in the learning process. Therefore, creating an emotionally safe learning environment is essential to foster students' courage, self-confidence, and active participation.

Teachers are also among the factors contributing to students' lack of engagement in learning (Nataliano Busa, 2023; Salo et al., 2023). Monotonous teaching methods are still used by teachers, where the learning process is one-way and not student-centered. The methods and approaches applied are often insufficiently varied to meet students' diverse needs, even though students should be emotionally and intellectually involved in the learning process.

Considering these issues, teachers need to adopt a more appropriate learning approach by implementing student-centered learning to encourage students to become more active and engaged in the learning process. According to the principle proposed by Carl R. Rogers, effective learning is student-centered, where each individual possesses unique characteristics and different learning styles (Nuriyani et al., 2023). One approach that aligns with this principle is differentiated instruction, which is a strategy that provides flexibility for students to learn according to their individual learning styles and needs. Differentiated instruction is a pedagogical approach that involves differentiating content, processes, teaching methods, resources, activities, and learning products to meet the learning needs of students with different levels of readiness, interests, and learning styles within the same classroom (Sugiyanto et al., 2026; Tezcan & Temel, 2023).

Teachers play a central role in implementing this approach effectively. Their confidence and skills in adapting instructional strategies are essential to effectively implement differentiated instruction (Schipper et al., 2018). Moreover, teachers' self-



efficacy in using adaptive teaching methods is critical in fostering student engagement (Deunk et al., 2018). Implementing differentiated instruction successfully also requires teachers to continuously adapt and reflect on their instructional strategies, highlighting the inherent complexity of this approach (Van Geel et al., 2019).

According to Sutisnawati and Lyesmaya the implementation of differentiated instruction that considers differences in learning styles has been shown to significantly increase students' learning activeness (Sutisnawati & Lyesmaya, 2019). This approach provides opportunities for each student to learn in ways that best suit their needs, thereby increasing self-confidence, motivation, and active participation during the teaching and learning process.

Various previous studies have demonstrated that learning approaches that are varied and adapted to students' needs can increase learning activeness. Differentiated instruction, which involves understanding students' characteristics, grouping them accordingly, and providing tasks appropriate to their abilities, can enhance both cognitive and moral development (Goyibova et al., 2025).

Differentiated learning approaches have also been found to enhance students' creativity and willingness to participate in classroom activities (Rosalina & Ritonga, 2024), improve engagement and activeness when students are grouped according to their learning strategies and foster critical and creative thinking during classroom problem-solving activities (Haelermans, 2022; Lestari et al., 2024).

Differentiated instruction, combined with Project-Based Learning, has also been shown to increase students' learning activities (Zulkhi et al., 2024). Research conducted by Zebua et al. (2024) found that the differentiated instruction approach effectively encourages student activeness, measured across five aspects: concentration, collaboration skills, the courage to express opinions or ideas, involvement in problem-solving, and discipline (Zebua et al., 2024).

During the pre-cycle stage, observations showed that only a small number of students were active. In Cycle I, student activeness increased with the following results: 67% demonstrated learning concentration, 53% demonstrated cooperation, 17 students expressed their opinions, 53% were involved in problem-solving, and 55% demonstrated discipline. However, the targeted level of $\geq 75\%$ student participation had not yet been achieved. In Cycle II, significant improvements were observed: 85% of students demonstrated concentration, 78% showed collaboration, 80% actively expressed their opinions, 78% contributed to problem-solving, and 89% demonstrated discipline.

Referring to the findings of previous studies above, differentiated instruction can be considered a potential solution for improving students' learning activeness. However, most previous studies have primarily focused on specific learning models, such as Project-Based Learning (PBL) or active debate, rather than on approaches that comprehensively adapt to students' learning styles, readiness, and interests.

Therefore, this study aims to examine whether the differentiated instruction approach can improve students' learning activeness. Based on the background described above, this study examines the effect of differentiated instruction on the learning activeness of fourth-grade elementary school students in the topic of Regions and Natural Resources. This study aims to:



1. Identify the implementation of differentiated instruction in elementary schools.
2. Determine the level of learning activeness of fourth-grade elementary school students in the topic of Regions and Natural Resources.
3. Analyze the effect of differentiated instruction on the learning activeness of fourth-grade elementary school students in the topic of Regions and Natural Resources.

This research is motivated by the lack of student involvement during the teaching and learning process, indicating the need for a learning approach that can effectively increase students' learning activeness.

RESEARCH METHOD

This study employed a quantitative approach because it focused on measuring and analyzing numerical data to determine the effect of one variable on another (Sugiyono, 2021). The research design was quasi-experimental, involving two groups: an experimental class and a control class. The research was conducted in Caringin District, Sukabumi Regency, during the first semester of the 2025/2026 academic year, from July to September 2025. The research subjects were fourth-grade students. The population for this study consisted of 291 individuals, with a sample size of 75 determined using Slovin's formula (Sugiyono, 2023). This sample was determined using purposive sampling because it was not possible to randomly select students from each school. The experimental class received treatment using the differentiated instruction approach. The experimental class received treatment using the differentiated instruction approach, while the control class followed learning through conventional teaching methods.

Data collection techniques used in this study included observation, documentation, and questionnaires. Observation was conducted during the learning process to examine students' involvement in teaching and learning activities. Documentation was used to support the research data, such as attendance lists, records of learning outcomes, and photographs of learning activities. Meanwhile, questionnaires were administered to students to obtain data on their level of learning activeness before and after the implementation of differentiated instruction (Fiantika et al., 2022).

The research instrument consisted of a learning activeness questionnaire developed based on indicators of student learning activeness, including participation, concentration, cooperation, and asking questions during the learning process. The questionnaire consisted of 32 statements measured using a four-point Likert scale. Example items included "I actively participate in classroom discussions" and "I ask questions when I do not understand the material." The categories of the Likert scale used in this study are presented in Table 1. Before being used, the instrument was tested for validity and reliability using IBM SPSS Statistics 27 (Darma, 2021). The results showed that 20 items were valid and 12 were invalid, and the instrument demonstrated high reliability with a Cronbach's Alpha of 0.760. The table below shows the Likert scale criteria according to (Sugiyono, 2018) used in this study.

Table 1. Likert Scale Categories

Item	Score
Always	4
Often	3
Sometimes	2
Never	1

The collected data were analyzed using descriptive and inferential analysis. Descriptive analysis was used to examine the level of students' learning activeness before and after the treatment. Meanwhile, inferential analysis was conducted to test the research hypothesis. The tests used include the normality test, homogeneity test, and the independent samples t-test. Normality and homogeneity tests were conducted to ensure that the data met the requirements for parametric analysis. At the same time, the independent samples t-test was used to determine whether there was a significant effect of implementing differentiated instruction on the learning activeness of fourth-grade students in the topic of Regions and Natural Resources.

RESULTS AND DISCUSSION

Results

The research findings were obtained from the pre- and post-test results of two groups: the experimental and control groups. The results were then processed and analyzed according to the previously established research procedures and stages.

Before conducting the hypothesis analysis, validity and reliability tests were performed on the research instrument, a student learning activeness questionnaire. Based on the test results using IBM SPSS Statistics 27, 20 out of 32 items were declared valid because their r-values exceeded the r-table value of 0.316.

Furthermore, the reliability test results showed a Cronbach's alpha of 0.760, indicating that the instrument has high internal consistency and is therefore reliable for measuring students' learning activeness. The detailed results of the pre-test and post-test data analysis are presented in Table 2.

Table 2. Pre-test and Post-test Data Analysis

Description	Control Class		Experimental Class	
	Pre-Test	Post-Test	Pre-Test	Post-Test
Number of Students	19	19	38	38
Highest Score	50	49	51	51
Lowest Score	29	31	29	38
Average	39.5	41.5	39.34	43.68

Based on Table 2, a general description of students' learning activeness before and after the implementation of differentiated instruction can be observed. In the experimental class, the average pre-test score of 39.34 increased to 43.68 in the post-test. In contrast, the control class showed only a slight increase, from an average pre-test score of 39.5 to a post-test score of 41.5.

The higher average increase in the experimental class indicates that the implementation of differentiated instruction contributed to improving students' learning activeness. Observational results also support these findings, showing that students in the experimental class were more active in discussions, participated more in group activities, and demonstrated greater enthusiasm for learning compared to students in the control class.

Table 4. Normality Test

18	Sig	Keterangan
Post-test Control Class	0.120	Normal
Pre-test Control Class	0.023	Normal
Post-test Experimental Class	0.273	Normal
Pre-test Experimental Class	0.168	Normal

19 The results of the normality test using the Shapiro-Wilk test are presented in Table 4. The significance values for the pre-test and post-test data in both the experimental and control classes exceed 0.05, indicating that the data are normally distributed. Since the normality assumption is fulfilled, the research data are suitable for further analysis using parametric tests.

Table 5. Homogeneity Test

Activeness Questionnaire Results	Based on Mean	Sig .177
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26 The homogeneity test was conducted to determine whether the variance between the groups was similar. As shown in Table 4, the significance value of Levene's Test is above 0.05, indicating that the data are homogeneous. The similarity in variance between the experimental and control classes indicates that both groups have a relatively similar level of data variability, enabling a fair comparison of learning outcomes.

Table 6. Independent Samples t-test

Activeness Questionnaire Results	Equal variances assumed	Sig <0.001
17		Sig <0.001

The hypothesis test was conducted using an independent samples t-test to determine whether differentiated instruction has a significant effect on students' learning activeness. The results presented in Table 5 show a significance value (Sig. 2-tailed) of < 0.001. This value is smaller than the significance level of 0.05; the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_a) is accepted. Thus, it can be concluded that the implementation of differentiated instruction has a significant effect on the learning activeness of fourth-grade elementary school students in the topic of Regions and Natural Resources.

Discussion

Based on the results of the validity and reliability tests, the research instrument was deemed suitable for use, with a Cronbach's alpha of 0.760, indicating a high level of internal consistency. The research data also met the requirements for normality and homogeneity tests, with significance values above 0.05. These results confirm that the data are normally distributed and have homogeneous variance, indicating that the hypothesis test results are reliable. Berdasarkan temuan tersebut dapat didapatkan Kesimpulan bahwa pada pembelajaran IPA terkait materi Wilayah dan Sumber Daya alam dapat mempengaruhi aktivitas belajar siswa. Hal itu sesuai dengan yang disampaikan oleh Carl R. Rogers yaitu "I have come to feel that the only learning which significantly influences behavior is self-discovered, self-appropriated learning" (Rogers, 1961). A learning process that students discover and internalize for themselves fosters concentration during science lessons; this aligns with the principles of Differentiated Instruction, which aligns learning methods with learning objectives to enhance student focus, and increased concentration, in turn, boosts student learning activity.



A. Implementation of Differentiated Instruction in Elementary Schools

Differentiation theories are guided by several core principles (Smale-Jacobse et al., 2019). A well-implemented differentiated instruction program can foster active, collaborative, and reflective learning (Langelaan et al., 2024). The observation results and implementation of differentiated instruction in the experimental class indicate that the learning process was adjusted to students' differences in abilities, interests, and learning styles. In this study, the researcher acted as an observer, with a research assistant serving as a facilitator, organizing learning activities so that each student could learn in ways that suited their individual characteristics.

At the planning stage, the researcher designed a range of learning content, processes, and products. In terms of content, teaching materials were adjusted according to students' levels of readiness. Students with higher abilities were provided with additional challenges through problem-solving tasks, while students with moderate abilities focused on understanding basic concepts through visual learning activities and simple practical exercises.

In the process aspect, learning activities were designed through group work, discussions, and small projects that facilitated students' sharing of knowledge with one another. Meanwhile, in the product aspect, students were given the freedom to choose the type of learning outputs, such as creating mini-posters, mind maps, or short written reports about the natural resources in their region. Students' learning outcomes were evaluated not only based on their final products but also on their participation and effort throughout the learning process. Through this approach, teachers can better accommodate the diversity of student abilities in the classroom, create a more inclusive learning environment, and ensure that all students receive equal opportunities to participate in learning.

Overall, the implementation of differentiated instruction in elementary schools proved effective because the researcher was able to adjust planning, implementation, and evaluation of learning to students' characteristics. This approach positively impacted student participation and interaction during the teaching and learning process.

B. The Level of Learning Activeness of Fourth-Grade Students in the Topic of Regions and Natural Resources

Based on descriptive data analysis, the level of learning activeness among fourth-grade students increased significantly after the implementation of the differentiated instruction approach. This improvement is reflected in the increase in students' average pre- and post-test scores in the experimental class. In the experimental class, the average pre-test score of 39.34 increased to 43.68 in the post-test, indicating that students became more actively involved in the learning process after the implementation of differentiated instruction. In contrast, the control class, which used conventional teaching methods, showed only a slight increase, with the average pre-test score rising from 39.5 to 41.5 in the post-test. The comparison between the two classes suggests that differentiated instruction is more effective in promoting students' learning activeness than traditional instructional methods.

The increase in students' learning activeness in the experimental class was clearly observed during the learning process. Students demonstrated positive behavioral changes, such as greater confidence in asking questions, actively responding to the teacher's explanations, and participating more actively in group discussions. They also

appeared more focused during lessons, paid closer attention to the teacher's explanations, and showed greater curiosity about the learning material. These findings support the view that diversity in education is inevitable and that differences among students are inherent within classroom environments (Belfi et al., 2012; Febrianti et al., 2025). Adapting learning to each student's differences can increase students' confidence in the learning process.

Observation results further revealed that students were not merely passive listeners but were actively involved in visual, oral, writing, and drawing activities. For instance, when students were allowed to create learning products based on their interests, they enthusiastically collaborated and took initiative to improve and refine their work. This finding supports the development of each student by recognizing that students have different ways of learning and responding to instruction (Gay, 2018).

The increase in learning activeness was also reflected in improved student concentration and cooperation. During group activities, students helped one another understand the material and complete tasks collaboratively. Discussions became dynamic, with each student able to express their opinions. The researcher also provided space for students to evaluate and reflect on their own learning outcomes, creating effective two-way interaction in the learning process.

Compared with the initial condition before treatment, students in the experimental class, who were previously mostly passive, with only 23% active without guidance, showed a significant improvement after the implementation of differentiated instruction. Students became more involved in each stage of the learning process, appeared more confident and enthusiastic, and were able to complete tasks without always relying on the teacher's instructions.

These findings suggest that differentiated instruction provides students with opportunities to express their individual abilities and learning styles. Adapted learning that meets individual needs makes students feel valued and more engaged in the learning process. This directly influences their motivation and enthusiasm for learning, which in turn increases their learning activeness.

Overall, the results indicate that the level of learning activeness in the experimental class was considerably higher than that in the control class. A flexible, engaging, and varied learning environment provides meaningful learning experiences for students. In addition to understanding concepts, students also develop critical thinking, collaboration, and communication skills.

C. The Effect of Differentiated Instruction on the Learning Activeness of Fourth-Grade Elementary School Students in the Topic of Regions and Natural Resources

The results of the independent samples t-test conducted in IBM SPSS Statistics 27 yielded a significance value (Sig. 2-tailed) of < 0.001 , which is lower than the predetermined significance level of 0.05. According to the hypothesis testing criteria:

1. If the Sig. (2-tailed) value $> \alpha = 0.05$, then the null hypothesis (H_0) is accepted, and the alternative hypothesis (H_a) is rejected, indicating that there is no effect of differentiated instruction on the learning activeness of fourth-grade students in the topic of Regions and Natural Resources.
2. Conversely, if the Sig. (2-tailed) value $< \alpha = 0.05$, then the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_a) is accepted, indicating that there is an effect of differentiated instruction on students' learning activeness.



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Since the significance value obtained in this study is < 0.05 , the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_a) is accepted. This result confirms that the implementation of differentiated instruction has a significant effect on the learning activeness of fourth-grade elementary school students in the topic of Regions and Natural Resources.

These findings indicate that the differentiated instruction approach can significantly enhance students' engagement and participation compared to conventional teaching methods. The approach allows students to learn according to their abilities, interests, and learning styles. The teacher acts as a facilitator, adjusting learning strategies to be more inclusive and adaptive to each student's needs in the classroom.

The effectiveness of this approach is closely related to the core characteristics of differentiated instruction, namely flexibility and student-centered learning (Ionna & Konstantinos, 2023). Tomlinson emphasizes the importance of recognizing and accommodating students' diverse abilities, interests, and learning styles to promote meaningful and effective learning experiences (Dulfer et al., 2025; Tomlinson, 2014). In the learning process of this study, students were provided opportunities to express their understanding through various activities such as discussions, group projects, and reflection activities. These learning conditions encouraged students to become more actively involved, confident in expressing their opinions, and responsible for their learning outcomes.

The observation results also show that students in the experimental class appeared more confident and enthusiastic than students in the control class. They demonstrated greater initiative in completing tasks and actively participated in group discussions and question-and-answer sessions. Meanwhile, students in the control class still showed a tendency to be passive and dependent on the teacher's guidance.

This difference highlights the significant role of differentiated instruction in improving students' learning activeness across cognitive, affective, and psychomotor domains. Students not only developed a deeper understanding of the material but also actively participated in learning activities. This improvement can be seen in the increase in average post-test scores as well as in the observation results, which indicate positive changes in students' learning behavior.

The differentiated instruction approach also creates an enjoyable classroom atmosphere and fosters students' enthusiasm for learning. Teachers provide students with the freedom to explore their own learning methods while also offering guidance for those who need additional support (Al-Ajmy & Al-Mutairi, 2023). This combination of learning freedom and teacher support makes students feel comfortable, valued, and motivated to actively participate in every learning process.

The findings of this study demonstrate that the differentiated instruction approach has a positive and significant effect on students' learning activeness. Adapted learning is more effective in increasing participation, collaboration, and responsibility for learning. This study also highlights that implementing differentiated instruction encourages teachers to appreciate individual differences in classroom teaching practices (Kara & Tekindur, 2025). This, in turn, provides greater opportunities for students to explore knowledge according to their own interests and abilities.



CONCLUSION

Fundamental Finding

This study, entitled "The Effect of Differentiated Instruction on the Learning Activeness of Fourth-Grade Elementary School Students in the Topic of Regions and Natural Resources," aimed to examine the implementation of differentiated instruction in elementary schools, analyze students' levels of learning activeness, and determine the effect of this instructional approach on learning activeness.

The results indicate that differentiated instruction was implemented by adapting content, learning processes, products, and the learning environment to students' needs and characteristics. The researcher grouped students by their abilities, interests, and learning styles and provided them with the freedom to demonstrate their learning outcomes through activities such as discussions, presentations, and group projects. This approach created a more interactive, enjoyable, and student-centered learning environment.

The level of students' learning activeness in the experimental class experienced a significant increase compared to the control class. Based on descriptive data analysis, the average pre-test score of 39.34 increased to 43.68 in the post-test. These results indicate that after the implementation of differentiated instruction, students became more active, more confident in expressing their opinions, and more enthusiastic in participating in the learning process. Students appeared more self-confident, collaborated effectively, and took responsibility for assigned tasks. This improvement demonstrates that differentiated instruction can foster students' motivation to learn, curiosity, and active participation, both physically, mentally, and emotionally.

The results of the independent samples t-test show a significance value (Sig. 2-tailed) of < 0.001 , which is lower than the significance level of 0.05. Based on the testing criteria, if the Sig. (2-tailed) value $< \alpha = 0.05$, then the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_a) is accepted. This means that the implementation of differentiated instruction has a significant effect on the learning activeness of fourth-grade elementary school students in the topic of Regions and Natural Resources.

Learning adjusted to students' individual needs and abilities has been proven to increase their participation and active engagement. Overall, the results of this study demonstrate that differentiated instruction is an effective learning strategy for improving students' learning activeness. This approach helps teachers create an adaptive, student-centered learning process that fosters students' motivation and self-confidence in participating in learning activities.

Limitation

This study still needs further development because the testing was conducted only within the sub-district scope. This indicates that the research still has strong potential to be expanded and tested on a broader scale. In addition, incorporating other innovative variables could further enhance the effectiveness of differentiated instruction.

Future Research

Future research is encouraged to explore innovations in differentiated learning combined with other instructional models—for example, a Discovery Learning model based on differentiated instruction. Based on the research potential, broader research can subsequently be conducted to obtain more comprehensive results.



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