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The effect of the teaching at the right level (TaRL) approach and learning activeness on fifth-grade students' IPAS learning outcomes

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ABSTRACT

This study examined the effects of Teaching at the Right Level (TaRL), learning activeness, and their interaction on fifth-grade students' integrated science and social studies (IPAS) achievement. A quasi-experimental 2 × 2 factorial design involved 40 students from two intact classes assigned to TaRL and conventional instruction. Learning activeness was assessed before treatment and categorised as high or low. Achievement was measured using a validated 25-item post-test. Data were analysed using independent-samples t-tests and two-way ANOVA. TaRL students achieved higher scores than controls (80.40 vs. 71.40, $p = .018$). Differences were significant among less active students (77.20 vs. 62.00, $p = .003$), but not among highly active students ($p = .452$). A significant interaction emerged ($F(1, 36) = 4.57$, $p = .039$, $\eta p^2 = .11$). TaRL was associated with improved achievement, particularly among less active learners, although class-level confounding limits causal interpretation and generalisability.

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Introduction

Effective elementary education requires instructional practices that accommodate differences in students' prior knowledge, learning readiness, and academic abilities. Within Indonesia's Merdeka Curriculum, Ilmu Pengetahuan Alam dan Sosial (IPAS) integrates natural sciences and social studies to promote contextual understanding and meaningful learning (Lufiana & Hadi, 2025; Rahmawati et al., 2025). At Phase C (Grades V–VI), social studies content emphasises regional geography, cultural diversity, local wisdom, and economic activities (Sutinah et al., 2025). However, heterogeneous learning abilities may create achievement disparities when instruction follows uniform expectations. These challenges are particularly relevant, Daerahku Kebanggaanku, which requires students to interpret cultural heritage and regional economic characteristics. Therefore, differentiated instruction is essential for accommodating diverse learning needs and supporting students' conceptual understanding.

Learning activeness is an important learner characteristic associated with academic achievement and classroom participation. It reflects observable behaviours such as asking questions, responding to instruction, collaborating, and completing learning activities. Although related to student engagement, activeness primarily concerns behavioural participation, whereas engagement encompasses behavioural, cognitive, and emotional

dimensions (Wong & Liem, 2022). Previous meta-analytic evidence indicates that engagement contributes to the relationship between teacher support and academic achievement (Tao et al., 2022). Preliminary observations at SDN 19 Pasir Tinggi revealed limited classroom participation and predominantly uniform instruction. Only 25% of students achieved the minimum mastery criterion of 75, with an average score of 69.65. These conditions indicate the need to investigate instructional approaches responsive to differences in students' learning characteristics.

Teaching at the Right Level (TaRL) provides a differentiated instructional approach that aligns learning activities with students' demonstrated competencies rather than their grade placement (Dewi, 2026; Lubab & Taufiq, 2024). Developed by Pratham, TaRL emphasises diagnostic assessment, ability-based grouping, targeted instruction, and continuous evaluation (Banerjee et al., 2017; Banerji & Chavan, 2020). This approach enables teachers to adjust instructional difficulty and provide structured guidance according to students' learning needs (Lakshman, 2019). In Indonesia, TaRL has been implemented to accommodate differences in students' abilities through flexible instructional practices (Suharyani et al., 2023). Its application in elementary IPAS involves diagnostic assessment, differentiated activities, formative evaluation, and instructional reflection (Widaningsih et al., 2025). Nevertheless, its implementation in social studies requires adaptation to conceptual reasoning, cultural understanding, and contextual learning.

Previous studies have demonstrated promising outcomes from TaRL implementation in elementary education. Azlina et al. (2025) reported improvements in fifth-grade IPAS achievement, while Yunus et al. (2025) identified higher learning outcomes under TaRL than conventional instruction. Similar improvements were reported when TaRL was integrated with problem-based learning (Afwanda et al., 2025). Other studies documented increased participation and achievement (Lestari et al., 2024) and differences in activeness and conceptual understanding (Yulianto et al., 2026). TaRL has also been applied to social studies instruction and local cultural learning (Kasa et al., 2024; Mustika et al., 2026). However, differences in research designs and instructional interventions limit direct comparisons. Most studies primarily examined overall achievement or participation rather than variation in effectiveness across students' initial activeness levels.

Despite growing evidence supporting TaRL, the moderating role of learning activeness remains insufficiently examined in the reviewed literature. Previous studies generally positioned activeness as an instructional outcome rather than a pre-existing learner characteristic (Lestari et al., 2024; Ruliani & Harun, 2024; Yulianto et al., 2026). Consequently, whether TaRL produces comparable benefits for students with different participation levels remains unclear. Students with lower activeness may benefit more from structured guidance and ability-matched tasks, whereas highly active students may already possess effective learning strategies. However, this explanation requires empirical verification (Hasanah et al., 2025; Helvianti & Karim, 2026; Pratiwi et al., 2025; Sabir et al., 2025). The present study addresses this gap by examining the interaction between instructional approach and initial learning activeness, thereby extending previous research beyond comparisons of overall instructional effectiveness.

Accordingly, this study aimed to examine the main effects and interaction of the TaRL approach and learning activeness on fifth-grade students' IPAS learning outcomes in Chapter 7, Daerahku Kebanggaanku. A quasi-experimental 2 × 2 factorial design was employed to investigate differences between TaRL and conventional instruction across high and low activeness levels. The study examined whether instructional approach and initial activeness were associated with achievement and whether the effectiveness of TaRL differed according to students' participation characteristics. Comparisons within each activeness category were also conducted to clarify the interaction pattern. The study hypothesised significant main effects of instructional approach and learning activeness, alongside their interaction (Budiana et al., 2025; Fauzi et al., 2023; Lukmiantoro & Saputro, 2024). These findings are expected to inform differentiated instructional practices for heterogeneous elementary classrooms while acknowledging the limitations of non-randomised group allocation.

Method

This study employed a quantitative quasi-experimental design with a 2 × 2 factorial arrangement to examine the effects of instructional approach and learning activeness on fifth-grade students' IPAS achievement. The instructional factor comprised Teaching at the Right Level (TaRL) and conventional instruction, while learning activeness was treated as a pre-treatment attribute classified into high and low categories (Sugiyono, 2022). The population consisted of 87 fifth-grade students from four classes at SDN 19 Pasir Tinggi, Agam Regency, Indonesia. Using purposive sampling, two intact classes were selected: Class Va (n = 20) received TaRL instruction, whereas Class Vd (n = 20) received conventional instruction. Preliminary daily-test scores satisfied normality assumptions (Shapiro–Wilk, p = .161–.965) and homogeneity of variance (Levene's $F(3, 83) = 0.85$,

p = .471). However, these tests did not establish equivalence in baseline achievement, and the absence of individual randomisation introduced potential selection and class-level confounding.

Two instruments were administered to assess learning activeness and academic achievement. Learning activeness was measured before treatment using a 30-item, five-point Likert questionnaire covering enthusiasm, teacher interaction, collaboration, independent learning, group participation, and discussion involvement, adapted from Djamarah (2010). Students were categorised using their respective class means, producing four factorial cells containing 10 students each; this classification may introduce differences in thresholds between classes (Azwar, 2013). Achievement was assessed using a 25-item multiple-choice test covering cultural heritage and regional economic activities. Both instruments underwent expert review and pilot testing among sixth-grade students outside the study sample. Item validity was examined using Pearson correlations ($p < .05$), while internal consistency was high for the questionnaire (Cronbach's $\alpha = .979$) and achievement test ($\alpha = .940$). Test-item discrimination and difficulty were also evaluated using established educational assessment procedures (Arikunto, 2009). Although these results supported preliminary instrument quality, the questionnaire's exceptionally high reliability warrants consideration of potential item redundancy.

Both classes received six instructional sessions, each lasting 70 minutes, covering identical IPAS content and learning objectives. In the experimental class, TaRL involved diagnostic assessment, ability-based grouping, differentiated learning tasks, teacher guidance, and formative assessment. The control class received conventional instruction through explanations, question-and-answer activities, discussions, and uniform assignments. Following the intervention, both groups completed the same achievement post-test. Data were analysed using descriptive statistics, independent-samples t-tests for overall and activeness-specific comparisons, and two-way analysis of variance (ANOVA) to examine the main and interaction effects. Normality was assessed using Kolmogorov–Smirnov and Shapiro–Wilk tests, while variance homogeneity was examined using Levene's test. Cohen's d and partial eta squared (ηp^2) were used to quantify effect sizes, with statistical significance established at $p < .05$ using SPSS. Given the factorial design, subgroup comparisons were interpreted cautiously because of multiple testing, while the use of one intact class per instructional condition limited the separation of treatment effects from classroom characteristics.

Results and Discussions

Before hypothesis testing, the prerequisite assumptions were examined. The post-test scores of both classes were normally distributed (Kolmogorov–Smirnov $p = .200$ for both classes; Shapiro–Wilk $p = .736$ for the experimental class and $p = .948$ for the control class), and their variances were homogeneous (Levene's $F(1, 38) = 0.72$, $p = .403$). Parametric tests were therefore appropriate. Descriptive statistics for each cell of the factorial design are presented in Table 1.

Table 1. Descriptive statistics of IPAS post-test scores by learning approach and learning activeness

Group	Activeness	n	M	SD	Min	Max	Mastery (%)
TaRL	High	10	83.60	6.92	76	96	100
	Low	10	77.20	11.63	60	96	50
	Total	20	80.40	9.88	60	96	75
Conventional	High	10	80.80	9.20	68	96	70
	Low	10	62.00	8.27	48	72	0
	Total	20	71.40	12.87	48	96	35

Note. Mastery = percentage of students scoring at or above the minimum mastery criterion (KKM = 75).

Table 1 shows that the TaRL class obtained a higher mean than the conventional class (80.40 vs. 71.40), and 75% of its students reached the mastery criterion compared with 35% in the control class. The gap between the classes was much wider among less active students (77.20 vs. 62.00) than among highly active students (83.60 vs. 80.80). Notably, none of the less active students in the conventional class reached mastery, whereas half of their counterparts in the TaRL class did. The results of the independent samples t-tests for Hypotheses 1 to 3 are summarised in Table 2.

Table 2. Results of the independent samples t-tests (TaRL vs. conventional)

Comparison	Levene p	t	df	p (2-tailed)	Mean diff.	95% CI	Cohen's d
All students	.403	2.482	38	.018	9.00	[1.66, 16.34]	0.78
High activeness	.320	0.769	18	.452	2.80	[−4.85, 10.45]	0.34
Low activeness	.268	3.368	18	.003	15.20	[5.72, 24.68]	1.51

The first hypothesis was supported. Students taught with TaRL scored significantly higher than those taught conventionally, $t(38) = 2.48$, $p = .018$, with a mean difference of 9.00 points and a medium-to-large effect ($d = 0.78$). This finding is consistent with the principle that instruction pitched at students' actual level allows them to engage with tasks they can complete and then build on (Banerjee et al., 2017; Lakshman, 2019). In the experimental class, the diagnostic assessment informed both grouping and task design, so students who had not yet mastered basic ideas about regional culture and local economic activities worked on consolidating them, while those who had mastered them moved on to more demanding tasks. In the control class, the same explanation and exercises were given to everyone, which risks being too difficult for some students and insufficiently challenging for others. The result agrees with experimental and pre-experimental findings on TaRL in fifth-grade IPAS (Azlina et al., 2025; Yunus et al., 2025), with the combination of TaRL and problem-based learning (Afwanda et al., 2025), and with the use of TaRL for social content (Kasa et al., 2024; Mustika et al., 2026).

The second hypothesis was not supported. Among highly active students, the TaRL group scored 2.80 points higher than the conventional group, but the difference was not significant, $t(18) = 0.77$, $p = .452$, $d = 0.34$. Highly active students already show the behaviours that Djamarah (2010) associates with active learning: enthusiasm, interaction with the teacher, cooperation, independent work, and participation in drawing conclusions. Such students appear able to profit from whatever learning opportunities are offered, so the additional structure of TaRL adds relatively little for them. This does not mean that TaRL is ineffective for active learners: their mean was still higher and all of them reached mastery, compared with 70% in the control class. Rather, with only 10 students per cell, a small effect of this size could not be distinguished from chance, and the high scores of this group may also have left limited room for improvement.

The third hypothesis was supported. Among less active students, the TaRL group outperformed the conventional group by 15.20 points, $t(18) = 3.37$, $p = .003$, a large effect ($d = 1.51$). Less active students tend to ask fewer questions, contribute less to discussion, and rely more on the teacher's direction. In a uniform lesson, they can easily fall behind without the difficulty being noticed. In TaRL, by contrast, their current level is identified beforehand, the tasks are adjusted to it, and the teacher works with smaller, more homogeneous groups, so these students receive guidance at the point where they need it. This explanation fits the core logic of TaRL as a remedial approach that starts from what students can already do (Banerji & Chavan, 2020; Suharyani et al., 2023). Earlier studies reported gains from TaRL for whole classes (Azlina et al., 2025; Yunus et al., 2025); the present result suggests that, in this sample, much of the advantage was concentrated among the students who were least engaged.

The fourth hypothesis was tested with a two-way ANOVA (Table 3).

Table 3. Results of the two-way ANOVA on IPAS learning outcomes

Source	Type III SS	df	MS	F	p	Partial η^2
Learning approach (A)	810.00	1	810.00	9.64	.004	.21
Learning activeness (B)	1587.60	1	1587.60	18.89	< .001	.34
A × B	384.40	1	384.40	4.57	.039	.11
Error	3025.60	36	84.04			
Corrected total	5807.60	39				

Note. $R^2 = .479$ (adjusted $R^2 = .436$).

Both main effects were significant: learning approach, $F(1, 36) = 9.64$, $p = .004$, $\eta_p^2 = .21$, and learning activeness, $F(1, 36) = 18.89$, $p < .001$, $\eta_p^2 = .34$. More importantly, the interaction between approach and activeness was also significant, $F(1, 36) = 4.57$, $p = .039$, $\eta_p^2 = .11$, so the fourth hypothesis was supported. The pattern of the interaction is shown in Figure 1.

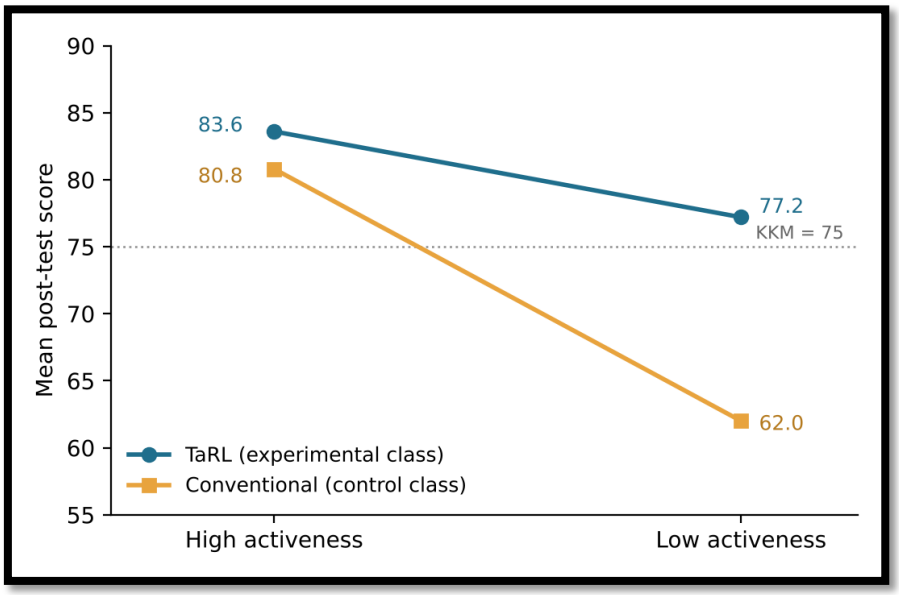

Figure 1. Interaction between learning approach and learning activeness on mean IPAS post-test scores

The lines in Figure 1 are not parallel. The TaRL group scored higher at both levels of activeness, but the gap widened from 2.80 points among highly active students to 15.20 points among less active students. The interaction is therefore ordinal: TaRL did not reverse the ranking of the two approaches at either level, but its advantage depended strongly on activeness. Seen from the other direction, the gap between highly and less active students was 18.80 points under conventional instruction but only 6.40 points under TaRL. In other words, TaRL substantially narrowed the achievement gap associated with differences in activeness. Because activeness was measured before the treatment, this interaction cannot be read as TaRL changing students' activeness; it means that the effect of the approach differed for students who entered the lesson with different levels of activeness.

The findings extend previous research by demonstrating that the association between Teaching at the Right Level (TaRL) and academic achievement varies according to students' initial learning activeness. Earlier studies primarily examined activeness as an instructional outcome, reporting improvements in classroom participation following TaRL implementation (Lestari et al., 2024; Ruliani & Harun, 2024; Yulianto et al., 2026). In contrast, the present study treated activeness as a pre-treatment learner characteristic and identified a significant interaction between instructional approach and activeness. This finding suggests that students' participation characteristics may help explain differences in achievement across instructional conditions. However, the interaction does not establish a reciprocal relationship between TaRL and activeness because changes in participation were not measured after treatment. Thus, the contribution of this study lies in identifying a potential moderating role of initial learning activeness rather than demonstrating a bidirectional relationship (Hidayat & Komariyah, 2026; Wijaya et al., 2024).

The greater achievement difference observed among less active students may be interpreted through the instructional structure provided by TaRL. Diagnostic assessment, ability-based grouping, and differentiated tasks potentially reduce mismatches between instructional demands and students' existing competencies. These mechanisms may be particularly relevant for learners who participate less frequently in classroom discussions or require additional instructional guidance. Meta-analytic evidence indicates that student engagement is associated with academic achievement and teacher support, providing a conceptual basis for understanding this pattern (Tao et al., 2022). Nevertheless, the present study did not directly measure instructional guidance, task accessibility, or changes in classroom participation. Consequently, these mechanisms should be regarded as plausible explanations rather than empirically established mediators. Future research should examine whether differentiated instructional support explains the relationship between TaRL implementation and achievement among students with varying levels of activeness (FATIMAH et al., n.d.; Khafidhoh et al., 2025).

From a pedagogical perspective, the findings suggest that students' initial participation characteristics deserve consideration when implementing differentiated instruction in elementary IPAS classrooms. Teachers may use diagnostic assessment to identify learning needs and organise instructional activities according to demonstrated competencies, while providing additional opportunities for less active students to participate meaningfully. However, the absence of a statistically significant difference among highly active students should not be interpreted as evidence that TaRL and conventional instruction are equally effective for this subgroup. The

observed interaction instead indicates that the achievement difference between instructional approaches varied across activeness categories within the investigated sample. Furthermore, instructional differentiation should not be restricted to less active learners, as highly active students may also require appropriately challenging tasks. These implications remain provisional because the study did not directly evaluate the instructional processes responsible for the observed achievement differences (Azhari et al., 2025; Tanjung et al., n.d.).

Several methodological limitations warrant consideration when interpreting these findings. The study involved only 40 students from one school, with 10 participants in each factorial cell, limiting statistical precision and generalisability. More importantly, assigning one intact class to each instructional condition prevented treatment effects from being distinguished reliably from classroom-specific influences, including teacher practices and prior achievement differences. Although preliminary scores satisfied normality and variance-homogeneity assumptions, these tests did not establish baseline equivalence, and no chapter-specific pre-test was administered. Additionally, self-reported activeness was dichotomised using class-specific means, potentially reducing measurement precision and comparability. The six-session intervention also prevented evaluation of sustained learning outcomes. Future studies should involve multiple classrooms per condition, assess baseline achievement, model activeness continuously, and examine instructional processes and longer-term outcomes to establish more robust evidence of differential TaRL effectiveness.

Conclusions

The Teaching at the Right Level approach produced better IPAS learning outcomes than conventional instruction among fifth-grade students, but its benefit was not uniform. For highly active students the two approaches produced similar results, whereas for less active students TaRL led to substantially higher outcomes. The significant interaction between learning approach and learning activeness shows that the value of instruction matched to students' actual ability depends on who the learners are: TaRL narrowed the achievement gap between more and less active students. This study adds to the TaRL literature by treating activeness as a learner attribute rather than an outcome and by testing its interaction with the approach in a factorial design. For practice, the findings support the use of diagnostic assessment and level-based grouping in IPAS classes with heterogeneous ability, with particular attention to students who participate least, while still providing challenging tasks for those who are already active.

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