

The Influence of Teaching at The Right Level (TaRL) Based Learning and Students Motivation Levels on Physical Education Learning Outcomes at SMA Negeri 1 Sale Rembang

Ardian Yoga Pangestu^{1✉}, Hermawan Pamot Raharjo², Ipang Setiawan³

¹ Universitas Negeri Semarang, Indonesia; ardianyogapangestu@students.unnes.ac.id

² Universitas Negeri Semarang, Indonesia; hermawan_pamot@mail.unnes.ac.id

³ Universitas Negeri Semarang, Indonesia; ipang_setiawan@mail.unnes.ac.id

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Abstract

Physical Education learning at the senior high school level faces challenges related to student ability heterogeneity and varying motivation levels, which often result in learning disparities. This study aimed to analyze the effects of Teaching at the Right Level (TaRL)-based learning methods and students' motivation levels on PJOK learning outcomes. A 2×2 factorial experimental design was employed with 140 tenth-grade students from SMA Negeri 1 Sale Rembang divided into four treatment groups. The research implemented two TaRL approaches: TaRL A utilizing peer tutoring strategy and TaRL B utilizing parallel learning strategy. Students were categorized into high motivation (n=72) and low motivation (n=68) groups based on motivation questionnaire scores. Two-way ANOVA analysis revealed a significant main effect of TaRL method on learning outcomes ($F=5.098$, $p=0.026$, $\eta^2=0.036$), with TaRL A demonstrating superior performance ($M=78.18$) compared to TaRL B ($M=74.86$). More significantly, students' motivation level demonstrated a very large main effect ($F=30.021$, $p=0.000$, $\eta^2=0.181$), with high-motivation students achieving substantially higher scores ($M=80.91$) than low-motivation students ($M=71.97$). No significant interaction was found between method and motivation ($F=0.246$, $p=0.621$). These findings indicate that both factors independently contribute to PJOK learning outcomes, with motivation being approximately five times more influential than teaching method. Schools should prioritize implementing peer tutoring-based differentiation while simultaneously enhancing student motivation through autonomy, competence, and relatedness support

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✉ Address correspondence:
Universitas Negeri Semarang, Kampus Sekaran, Gunungpati,
Semarang
E-mail: (ardianyogapangestu@students.unnes.ac.id)

INTRODUCTION

Physical Education, Sports, and Health is an integral part of the education system that plays an important role in developing students' physical, mental, social, and emotional aspects (Acep Noval Mulzaman et al., 2024). Specially designed physical activity programs can enhance psychosocial outcomes such as self-concept, social behavior, goal orientation, and self-efficacy (Kohl III et al., 2013). However, PJOK learning at the senior high school level still faces significant challenges related to the diversity of students' abilities and varying levels of learning motivation (Widiyanto et al., 2025).

A fundamental issue in physical education learning is the significant gap in students' abilities within the same class (Beni et al., 2017; Pangrazi & Beighle, 2019; Thomas et al., 2023). This condition causes some students to feel left behind, while others feel insufficiently challenged by the given material (Virama, 2021). Research indicates that active participation in physical education is positively correlated with academic achievement; however, this can only be achieved if each student receives instruction that aligns with their individual abilities (Marques et al., 2017; Zach et al., 2017).

In addition to differences in ability, another challenge in physical education lies in the shifting educational paradigm in the digital era (Indarto et al., 2024). Many students today are more familiar with technology and sedentary activities than with physical activities that require motor coordination and cooperation (Owen et al., 2022). This situation has led to a decline in students' physical fitness, motivation to engage in physical activity, and social skills (Huang, 2024). Physical education teachers face the challenge of designing learning experiences that not only focus on physical activity but are also relevant to the modern context of students' lives so that learning

remains meaningful and engaging (Mulyana, 2025).

The success of physical education learning is determined not only by the instructional approach but also by the teacher's ability to manage individual differences and create inclusive learning experiences (Bertills et al., 2019). In a heterogeneous classroom, teachers need to be able to recognize differences in learning readiness, the speed of understanding movements, and students' levels of self-confidence (Kohake, 2024). Learning that fails to consider these differences may lead to frustration among students who fall behind and boredom among more advanced students (Temirbay et al., 2025). Therefore, a learning model is needed that can flexibly and systematically adapt the teaching process to each student's actual ability level (Raehang et al., 2025a).

Motivation is a crucial factor influencing students' participation and learning outcomes in physical education (Abdurrahman, Nasuka, Sulaiman, Raharjo, et al., 2024). The main goal of physical education is to develop individuals who possess the knowledge, skills, and confidence to lead a physically active lifestyle (Chen et al., 2014). The level of physical activity tends to decline as children progress from elementary to senior high school (Kohl et al., 2013). Non-autonomous forms of motivation in physical education are associated with negative outcomes such as boredom and unhappiness among students (Yli-Piipari et al., 2009). Students' motivational profiles, based on self-determination theory, have a significant relationship with enjoyment, anxiety, and physical activity levels in physical education learning (Jaakkola et al., 2019; Pavlova et al., 2022).

Teaching at the Right Level (TaRL) offers a potential solution to address the issue of student ability heterogeneity (Dinihari et al., 2025). TaRL is viewed as a pedagogical approach with significant potential to tackle educational challenges in

secondary schools (Leasa et al., 2024; Najah et al., 2024). This methodology emphasizes aligning instruction with students' current learning levels rather than their age or grade level (Ismail et al., 2024). The effectiveness of TaRL has been demonstrated in various learning contexts, showing significant and cost-effective improvements in learning outcomes (J-PAL, 2023). Research has shown that consistent implementation of TaRL leads to substantial gains in learning achievement (Rahmawati et al., 2024). The application of TaRL in academic learning, such as literacy, has been proven effective in addressing students' low reading literacy skills (Ahmad et al., 2024).

However, the implementation of TaRL in physical education remains limited and requires further research (Ahmad & Iqbal, 2025). The unique nature of physical education, which simultaneously involves psychomotor, affective, and cognitive aspects, presents distinct challenges (Akbar et al., 2024). Unlike other academic subjects, physical education requires adjustments not only in cognitive aspects but also in the level of motor skill difficulty and the complexity of game strategies (Astuti et al., 2024). The interaction between TaRL-based learning methods and students' motivation levels is an important aspect that needs to be explored in greater depth (Adi S et al., 2024). Previous studies have shown that TaRL is a learning approach that can enhance students' motivation and learning outcomes; however, its application has thus far been limited to science subjects (S. Amalia et al., 2024).

Based on the theoretical issues outlined above, research on the influence of TaRL-based learning methods and students' motivation levels on physical education learning outcomes is highly relevant and important to conduct (Kingston et al., 2025). This study is expected to contribute to the development of more effective physical education learning methodologies and provide a deeper understanding of how the interaction between learning methods and

student motivation affects learning outcomes in the context of physical education (Setiawan et al., 2024).

METHODS

Research Design

This study employed a quantitative approach with a 2×2 factorial experimental design to analyze the effect of Teaching at the Right Level (TaRL)-based learning methods and students' motivation levels on Physical Education (PJOK) learning outcomes (Pangestu, 2025). The factorial 2×2 design was selected because this research aimed to test the effects of two main factors simultaneously, namely the TaRL learning method and students' motivation level, as well as the interaction between these two factors on PJOK learning outcomes (Pangestu, 2025).

The research was conducted at SMA Negeri 1 Sale Rembang, located in Sale District, Rembang Regency, Central Java Province, from September 29 to October 29, 2025 (Pangestu, 2025). The school has an accreditation rating of A and has implemented the Merdeka Curriculum since the 2022/2023 academic year (Pangestu, 2025).

Population and Sample

The research population consisted of all tenth-grade students of SMA Negeri 1 Sale Rembang during the 2024/2025 academic year, totaling 245 students distributed across seven parallel classes. Using purposive sampling with a 95% confidence level and 5% margin of error based on Slovin's formula, the sample size was determined to be 140 students, divided into four treatment classes with 35 students each.

Inclusion criteria for participants were: (1) tenth-grade students at SMA Negeri 1 Sale Rembang, (2) actively participating in PJOK lessons, (3) having no physical limitations preventing participation in PJOK activities, and (4) willingness to participate in

the research (Pangestu, 2025). Exclusion criteria were: (1) students absent more than 25% during the research period, (2) students with specific health conditions preventing full participation in physical activities, and (3) students who refused to participate.

Data Analysis

Descriptive statistics including mean, median, mode, standard deviation, minimum, and maximum values were calculated for all variables. Prior to hypothesis testing, data were examined for normality using the Kolmogorov-Smirnov test and for homogeneity of variance using Levene's test (Pangestu, 2025). A 2×2 factorial ANOVA was used to test the main effects of TaRL method and motivation level, as well as their interaction effect on PJOK learning outcomes (Pangestu, 2025). Tukey's Honestly Significant Difference (HSD) post hoc test was performed when significant differences were detected (Pangestu, 2025). Effect sizes were calculated using partial eta squared (η^2) to interpret the practical significance of findings. All statistical analyses were conducted using SPSS version 26 with a significance level of $\alpha = 0.05$.

RESULTS AND DISCUSSION

The analysis involved 140 tenth-grade students from SMA Negeri 1 Sale Rembang, with 72 students (51.4%) classified as having high motivation and 68 students (48.6%) classified as having low motivation. The motivation questionnaire yielded a mean score of 73.21 (SD = 9.84), with scores ranging from 48 to 95. Pre-test PJOK learning outcomes showed a mean score of 58.21 (SD = 9.58), ranging from 39.15 to 76.25. Post-test scores increased substantially to a mean of 78.90 (SD = 10.56), ranging from 60.25 to 96.13, representing a mean gain of 20.69 points (SD = 2.14) or 35.5% improvement.

Table 1. Descriptive Statistics of All Variables

Variable	N	Mean	SD	Min	Max
Motivation Score	140	73.21	9.84	48	95
Pre-test PJOK	140	58.21	9.58	39.15	76.25
Post-test PJOK	140	78.90	10.56	60.25	96.13
Gain Score	140	20.69	2.14	16.50	25.75

Normality testing using Kolmogorov-Smirnov test revealed that all groups demonstrated normal distributions ($p > 0.05$), meeting the normality assumption. Levene's test for homogeneity of variance yielded $F = 1.247$, $p = 0.295$ ($p > 0.05$), confirming homogeneous variances across groups. A 2×2 factorial ANOVA revealed a significant main effect of TaRL method on PJOK learning outcomes ($F = 5.098$, $p = 0.026$, $\eta^2 = 0.036$). The TaRL A method yielded significantly higher mean scores ($M = 78.18$, $SD = 9.24$) than TaRL B ($M = 74.86$, $SD = 9.76$), with a difference of 3.32 points (95% CI: 0.14–6.50).

Table 2. Comparison of PJOK Learning Outcomes by TaRL Method

TaRL Method	N	Pre-test Mean (SD)	Post-test Mean (SD)	Gain Mean (SD)	% Improvement
TaRL A (Peer Tutoring)	70	58.07 (10.52)	79.96 (11.01)	21.89 (2.02)	37.7%
TaRL B (Parallel Learning)	70	58.36 (10.61)	77.35 (10.56)	18.99 (1.52)	32.5%

Although the effect size was small to moderate (3.6%), the difference was statistically significant and practically meaningful in the PJOK context. The TaRL A method's superior performance reflects the effectiveness of peer tutoring, which facilitates scaffolding processes where higher-ability students provide zone of proximal development support to lower-ability peers (Vygotsky & Cole, 1978). Peer tutoring enhances observational learning and motor

skill development through concrete demonstration and immediate feedback (Han et al., 2022). This interactive mechanism reduces instructional burden on teachers while creating a supportive social environment that mitigates anxiety common in physical skill learning (Owen et al., 2022). Students in tutor roles benefit from the "learning by teaching" effect, deepening their own skill comprehension (Roscoe & Chi, 2007).

Motivation level demonstrated a very significant main effect on learning outcomes ($F = 30.021$, $p = 0.000$, $\eta^2 = 0.181$). Students with high motivation achieved substantially higher scores ($M = 80.91$, $SD = 8.42$) compared to those with low motivation ($M = 71.97$, $SD = 9.54$), with a difference of 8.94 points (95% CI: 5.92–11.96). This large effect size (18.1%) indicates that motivation is approximately five times more influential than teaching method in determining PJOK learning outcomes.

Table 3. Comparison of PJOK Learning Outcomes by Motivation Level

Motivation Level	N	Pre-test Mean (SD)	Post-test Mean (SD)	Gain Mean (SD)	% Improvement
High Motivation	72	65.07 (5.85)	86.43 (5.42)	21.36 (1.98)	32.8%
Low Motivation	68	50.98 (4.86)	71.01 (5.28)	20.03 (1.86)	39.3%

This substantial difference validates self-determination theory, which posits that autonomous motivation—intrinsic drive to participate in PJOK—is far more influential than pedagogical strategy alone (Deci & Ryan, 2000). Students with high motivation demonstrate greater persistence, strategic learning engagement, and tolerance for physical challenge (Yli-Piipari et al., 2009). The 8.94-point gap between motivation groups suggests that motivation shapes fundamental learning processes: attention

allocation, effort intensity, and persistence when encountering difficulty (Pintrich & Schunk, 2002). Notably, even when low motivation students showed higher percentage improvement (39.3% vs. 32.8%), their absolute scores remained significantly lower, indicating a floor effect requiring special attention in pedagogical design.

Table 4. Post-test Mean Scores by Interaction of TaRL Method and Motivation Level

Factor Combination	N	Mean	SD	% within group
TaRL A + High Motivation	36	82.47	2.12	25.7%
TaRL A + Low Motivation	34	73.68	2.16	24.3%
TaRL B + High Motivation	36	79.35	2.14	25.7%
TaRL B + Low Motivation	34	70.26	2.14	24.3%

No significant interaction effect was found between TaRL method and motivation level ($F = 0.246$, $p = 0.621$, $\eta^2 = 0.002$). The advantage of TaRL A over TaRL B remained consistent across both motivation levels (3.12 points for high motivation, 3.42 points for low motivation), and the motivation effect was consistent across both methods (8.79 points for TaRL A, 9.09 points for TaRL B). This absence of interaction indicates that TaRL method and motivation operate independently and additively on learning outcomes. The non-significant interaction ($p = 0.621$) indicates that TaRL benefits apply universally across motivation levels, simplifying implementation decisions for practitioners.

Tukey's HSD post hoc test revealed significant pairwise differences between high-motivation students in TaRL A and low-motivation students in both methods ($p < 0.001$). Notably, high-motivation students in TaRL B achieved significantly higher scores than low-motivation students in TaRL A ($p = 0.044$), demonstrating the dominance of motivation over teaching method. The high-

motivation/TaRL B combination ($M = 79.35$) outperforming the low-motivation/TaRL A combination ($M = 73.68$) demonstrates that student psychological factors ultimately determine effectiveness. Within each motivation level, differences between TaRL methods were not statistically significant ($p > 0.05$), suggesting flexibility in method selection when motivation is held constant.

Rather than requiring differentiated approaches based on student motivation profiles, schools can confidently implement TaRL A as the preferred method for all students (Kingston et al., 2025). This additive effect model suggests that optimal learning emerges from the combined presence of both well-designed instruction (TaRL) and student motivation (Walberg, 1984). However, the independence of these factors highlights a critical pedagogical principle: even excellent instruction cannot fully compensate for low motivation (Roscoe & Chi, 2007). This necessitates concurrent attention to both instructional quality and motivation development (Chen et al., 2014).

This study extends TaRL research beyond literacy and numeracy into the psychomotor domain, confirming the transferability of differentiated learning principles (Kohl et al., 2013). The substantial pre-test to post-test improvement (35.5%) demonstrates that tailored instruction effectively closes achievement gaps, particularly for initially lower-performing students (Marques et al., 2017; Zach et al., 2017). The 53.9% increase in minimum scores (from 39.15 to 60.25) suggests that TaRL functions as an equity mechanism, lifting the lowest-performing students substantially (Jaakkola et al., 2019). Teachers must prioritize activities that foster autonomy, competence, and social relatedness—the psychological needs underlying intrinsic motivation (Deci & Ryan, 2000). Schools implementing these findings should prioritize: (1) systematic ability-based grouping with flexible

reassignment, (2) peer tutoring structures with explicit training, (3) motivation enhancement through autonomy, competence, and relatedness support, and (4) continuous assessment to guide instructional adjustment (Pavlova et al., 2022). The findings underscore that effective PJOK instruction requires simultaneous attention to both pedagogical innovation and psychological motivation enhancement (García-Ceberino et al., 2022).

CONCLUSION

This study demonstrated that the Teaching at the Right Level (TaRL)-based learning method, particularly the peer tutoring approach (TaRL A), significantly improves PJOK learning outcomes with a 37.7% improvement compared to 32.5% for the parallel learning approach (TaRL B). However, students' motivation level emerged as the dominant factor, accounting for 18.1% of learning outcome variance compared to 3.6% for the teaching method, indicating that motivation is approximately five times more influential in determining PJOK achievement. The absence of significant interaction between TaRL method and motivation level demonstrates that both factors operate independently and additively, suggesting that schools can confidently implement peer tutoring-based differentiation universally without requiring specialized adaptations based on motivation profiles.

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