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Research Article

Evaluating Instructional Strategy Effectiveness of Physical Education Teachers in Implementing the Independent Curriculum

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ABSTRACT

Purpose of the study: The implementation of Indonesia's Independent Curriculum places strong emphasis on student-centered, project-based, and differentiated learning, including in Physical Education, Sports, and Health (PJOK), which plays a vital role in students' holistic development. This study aims to evaluate the extent to which PJOK teaching strategies aligned with the Independent Curriculum are implemented in five elementary schools in Palu City

Methodology: A quantitative descriptive research design was employed, integrating questionnaire data, classroom observations, and document analysis to obtain a comprehensive picture of instructional practices. The participants consisted of 15 PJOK teachers from five public elementary schools, with data collected using a four-point Likert-scale questionnaire to capture teachers' perceptions and self-reported practices.

Main Findings: The findings indicate that PJOK teachers have largely adopted the Independent Curriculum principles, particularly in planning, assessment, and participation in training programs, which achieved high performance levels. Nevertheless, persistent challenges were identified in the utilization of learning media, limited infrastructure, and time constraints, which restricted the optimal implementation of innovative PJOK learning activities.

Novelty/Originality of this study: The novelty of this study lies in its focused empirical examination of PJOK within the Independent Curriculum framework, a subject area that remains underrepresented in curriculum implementation research. By highlighting contextual disparities and practical constraints, this study provides evidence-based insights to inform policy decisions, school leadership strategies, and targeted professional development to strengthen PJOK instruction in primary education.

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1. INTRODUCTION

Indonesia's education system has undergone significant reform with the introduction of the Independent Curriculum (*Kurikulum Merdeka*). This curriculum aims to provide greater flexibility in teaching and learning, moving away from the limitations of the previous competency-based model. The focus is on student autonomy, contextual learning, and mastery of essential content through project-based and differentiated instruction [1]–[6].

The curriculum's shift aligns with global education trends that emphasize holistic development, creativity, and adaptability skills necessary for the 21st century [7]–[9].

In this context, Physical Education, Sports, and Health (*Pendidikan Jasmani, Olahraga, dan Kesehatan* or PJOK) plays a pivotal role, contributing to students' physical, emotional, and social well-being, which are central to sustainable development [2], [10], [11]. Traditionally an activity-based subject, PJOK is now designed to foster health awareness, teamwork, and responsible citizenship[12]–[15]. Teachers are tasked with developing instructional strategies that not only enhance motor skills but also nurture critical thinking, creativity, and character formation. To meet these demands, innovative pedagogical strategies, including project-based and inquiry-based learning, as well as interdisciplinary approaches, are encouraged [16]–[19]. Despite the progressive vision of the Independent Curriculum, several challenges emerge in its classroom implementation, particularly in the subject of physical education. Many teachers struggle to interpret and apply the curriculum's philosophical foundations, resulting in varied interpretations and inconsistent practices across schools [20]–[23]. Additionally, limited resources, insufficient professional training, and technological constraints further hinder effective implementation [24]–[27]. These conditions expose a significant gap between curriculum policy and actual classroom practices, underscoring the urgent need for systematic evaluation of instructional strategies in real educational settings.

Despite the rapid expansion of studies examining the implementation of Indonesia's Independent Curriculum, existing research remains largely dominated by policy-oriented evaluations and curriculum design analyses, with limited attention to how teachers enact instructional strategies in daily classroom practice, particularly in physical education at the primary school level. Most empirical studies employ macro-level evaluation frameworks, such as CIPP [28], [29] or compliance-based assessments [30], [31] which emphasize structural readiness and administrative alignment but remain limited in capturing the nuanced pedagogical processes through which teachers interpret, adapt, and operationalize curriculum principles in real teaching contexts. Moreover, research on Physical Education (PJOK) has predominantly focused on student outcomes or curricular content, leaving a critical gap in understanding teacher-centered enactment dynamics, including planning coherence, instructional execution, media utilization, assessment practices, and professional learning experiences under the Independent Curriculum. Consequently, empirical evidence explaining why variations in implementation quality persist across schools with similar policy mandates, and how institutional support, resource availability, and teacher agency interact to shape instructional effectiveness, remains insufficient. Addressing this gap is essential to move beyond descriptive compliance-oriented studies toward a more process-oriented evaluation of curriculum implementation grounded in teachers' instructional realities. Accordingly, this study provides a systematic, indicator-based evaluation of PJOK instructional strategy enactment in primary schools to generate empirically grounded insights into the pedagogical mechanisms underlying the effective implementation of the Independent Curriculum.

While theoretical frameworks suggest that effective teaching strategies in physical education should align with constructivist principles, promoting active learning and higher-order thinking skills, empirical evidence on the real-world implementation of these strategies remains scarce [12], [32]–[34]. Most existing studies focus on cognitive outcomes or curriculum design rather than on how teachers enact these strategies in classrooms. This research gap is particularly evident in primary education, where the effectiveness of these strategies has yet to be systematically evaluated. The present study seeks to address this gap by evaluating the instructional strategies employed by PJOK teachers in primary schools. Specifically, the study aims to: (1) Identify the types of instructional strategies used by PJOK teachers; (2) Assess the effectiveness of these strategies across six key indicators: planning, implementation, media and resources, assessment, challenges, and professional training (3) Investigate the factors that support or hinder the effective implementation of the Independent Curriculum.

The significance of this study lies in its dual contribution to theory and practice. Academically, it enriches the field of educational evaluation by providing empirical evidence on teacher behavior, curriculum enactment, and pedagogical adaptation in the context of physical education. Practically, the study offers valuable insights for policymakers, school leaders, and educators to design more targeted interventions, including professional development programs and resource allocation strategies, to enhance curriculum implementation at the grassroots level. Research Questions: 1) What instructional strategies do PJOK teachers use in implementing the Independent Curriculum?; 2) How effective are these strategies in terms of planning, implementation, assessment, and other key indicators?; 3) What factors support or hinder the successful implementation of the Independent Curriculum in PJOK classrooms?

2. RESEARCH METHOD

This study employed a quantitative descriptive approach aimed at evaluating the instructional strategies implemented by Physical Education, Sports, and Health (PJOK) teachers under the Independent Curriculum (*Kurikulum Merdeka*) in primary schools across Palu City, Indonesia. The descriptive design was chosen

because it systematically represents the real conditions of instructional implementation without manipulating research variables. Descriptive quantitative research seeks to portray existing phenomena as they occur naturally and to interpret emerging patterns through numerical data [35]. This approach was considered appropriate as the study intended to provide a comprehensive depiction of how PJOK teachers planned, conducted, and evaluated their instructional strategies in alignment with the principles of flexibility, autonomy, and student-centered learning emphasized in the Independent Curriculum.

The research process followed three major stages: Planning, Implementation, and Reporting, as illustrated in Figure 1. The Planning stage involved determining the research topic, formulating the research problem, conducting literature reviews, designing the research methodology, and preparing administrative procedures. The Implementation stage covered data collection through questionnaires, classroom observations, and document analysis, followed by data processing, analysis, and interpretation. The Reporting stage included writing the research report and preparing the manuscript for journal publication. This structured procedure ensured that all phases of the research were conducted systematically, validly, and in a manner that allows replication, consistent with the principles of educational evaluation research.

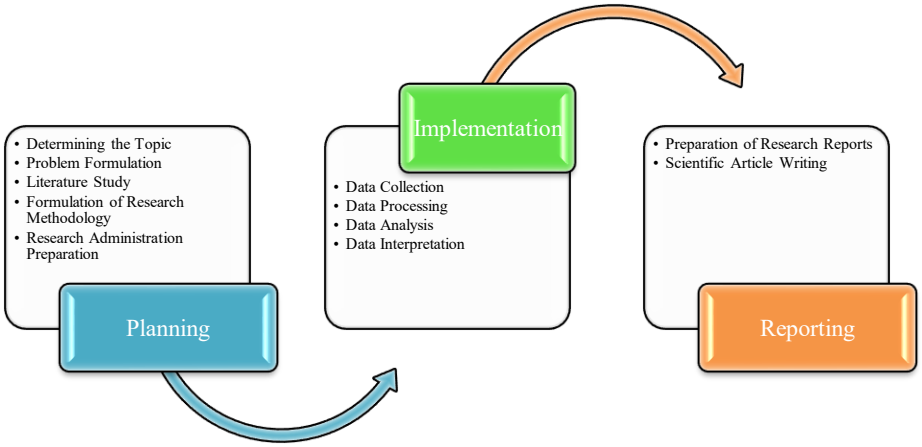

Figure 1. Research Procedure of the Study

The study was conducted in five public primary schools located in the Mantikulore District of Palu City. These schools were selected purposively to represent diverse conditions in terms of infrastructure, teacher readiness, and student demographics. Purposive sampling was used because the schools varied in terms of resources and professional development opportunities, providing an adequate representation of the diversity in teaching contexts. The sample consisted of 15 PJOK teachers (9 males and 6 females), with teaching experience ranging from 5 to 20 years. All participants had attended at least one professional development program related to the Independent Curriculum, such as the Guru Penggerak initiative or local training conducted by the education office. The inclusion of teachers with varied professional backgrounds and experiences ensured a comprehensive overview of curriculum implementation in real school contexts.

Data collection in this study employed three complementary instruments. The primary instrument used was a questionnaire designed to measure teachers' perceptions and implementation levels across six key indicators: planning, implementation, learning media and resources, assessment, challenges, and professional training. The questionnaire utilized a four-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (4). Additionally, classroom observations were conducted to verify teachers' actual practices in applying project-based and differentiated instruction. These observations provided qualitative data on the implementation of these teaching methods. Furthermore, document analysis was performed on lesson plans, teaching schedules, and assessment rubrics to assess the consistency between instructional planning and classroom implementation. The questionnaire used in this study was adapted from previous research on physical education pedagogy and curriculum evaluation [36]–[39], with modifications to align it with the context of primary education under the Independent Curriculum. The content validity of the instrument was reviewed by three experts in the fields of physical education pedagogy and curriculum evaluation to ensure that the instrument was relevant and valid for measuring the intended variables.

The reliability of the questionnaire was assessed using Cronbach's alpha. A pilot test with 5 teachers indicated that the instrument had high internal consistency, with a Cronbach's alpha value of 0.87. This value indicates excellent reliability, well above the acceptable threshold of 0.7 for social science research instruments. Validity was assessed through expert review for content validity and construct validity through factor analysis during the pilot testing phase. The instrument was deemed to accurately capture the constructs of instructional strategies, teacher effectiveness, and curriculum alignment.

The data collection process took place over six weeks during the 2024-2025 academic year. Ethical clearance was obtained from the Faculty of Teacher Training and Education at Tadulako University, and

research permissions were granted by the principals of all participating schools. Questionnaires were distributed directly and collected within one week. Classroom observations were conducted twice for each teacher to ensure consistency, with each observation lasting approximately 60 minutes. Field documentation, including observation notes and photographs, was gathered with the participants' consent. Supplementary materials such as teacher portfolios and school archives were also analyzed to strengthen data triangulation and validity.

Data collected from the questionnaires were analyzed using descriptive statistics (mean, standard deviation, percentage). The data were categorized into four groups using the Likert scale intervals, as shown in Table 1, to evaluate the level of implementation of PJOK instructional strategies.

Table 1. Conversion of Mean Scores to Likert Scale Categories.

Average Score Range	Category	Interpretation
3.26 – 4.00	Strongly agree (SA)	Very good/optimal implementation
2.51 – 3.25	Agree (A)	Implementation is good, but it can still be improved
1.76 – 2.50	Disagree (D)	Implementation is still low / not optimal
1.00 – 1.75	Strongly Disagree (SD)	There has been no implementation or very minimal

In addition to descriptive statistics, the qualitative data obtained from classroom observations and document analysis were analyzed thematically to identify patterns and insights that could complement the quantitative findings. This triangulation of data ensured a comprehensive evaluation of the PJOK instructional strategies. The use of descriptive statistics was justified to summarize the frequency and effectiveness of various instructional strategies across the six key indicators. The categorization of mean scores into four levels of implementation provided an evaluative framework for interpreting the data and identifying strengths and areas for improvement. The qualitative analysis of classroom observations and documents further enriched the findings by providing deeper insights into the actual practices and challenges faced by teachers.

3. RESULTS AND DISCUSSION

This section presents the analysis of the questionnaire responses completed by PJOK teachers across five schools. Table 2 below summarizes the scores for six key indicators: Planning, Implementation, Media & Resources, Assessment, Challenges, and Training. The data, collected using a four-point Likert scale, provides a comprehensive overview of the strengths and areas for improvement in the implementation of instructional strategies under the Independent Curriculum. The table offers a clear picture of the average scores for each indicator across different schools, which are analyzed in more detail in Table 2.

Table 2. Recapitulation of Questionnaire Scores per Teacher per Indicator

School Name	Planning	Implement ation	Media & Resources	Valuation	Constraints	Training
Elementary School Tondo	3.8	3.8	3.3	4.0	3.3	4.0
Elementary School 1 Tondo	3.8	3.5	3.7	3.8	2.5	4.0
Elementary School 1 Talise	3.6	3.4	3.5	3.6	2.8	3.9
Elementary School Lasoani	3.9	3.6	3.6	3.9	3.2	4.0
Elementary School Poboya	3.7	3.7	3.4	3.7	3.0	3.8

To complement the table, Figure 2 below presents a comparison of average implementation scores across the six indicators, providing a visual representation of the similarities and differences in how each school applies the Independent Curriculum through PJOK teaching strategies.

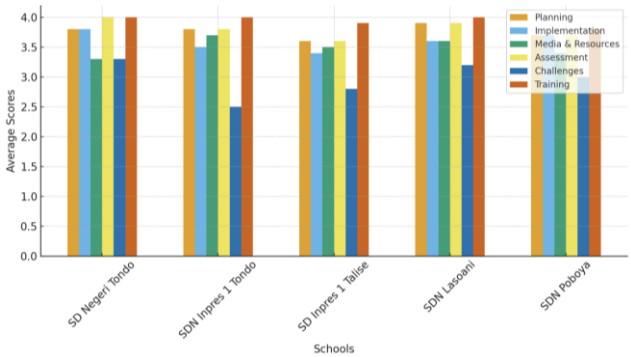

Figure 2. Comparison of PJOK Instructional Strategy Implementation Across Schools.

The bar chart highlights the overall "Good" to "Very Good" implementation of PJOK strategies across the schools. It also indicates that while planning, assessment, and training scored consistently high, media utilization and addressing challenges still require improvement. This observation suggests that there are certain areas where additional attention and support are needed for teachers to maximize the potential of the Independent Curriculum.

The analysis reveals that all schools achieved high scores, ranging from 3.6 to 3.9, indicating that teachers have effectively designed learning activities aligned with the Independent Curriculum. The highest score, recorded by Elementary School Lasoani (3.9), demonstrates exemplary planning, reflecting a strong understanding of curriculum objectives. This result aligns with several studies, who emphasize that effective planning is integral to fostering student-centered learning and aligning with project-based learning principles [19], [40]–[43]. The findings highlight teachers' ability to integrate content, formative assessments, and differentiated instruction to enhance students' critical thinking and expressiveness.

Scores for the implementation indicator ranged from 3.4 to 3.8, indicating that project-based and differentiated learning are being consistently adopted. Elementary School Tondo and Elementary School Poboya achieved the highest scores, suggesting that these schools have successfully engaged students in meaningful projects while considering individual learning needs. These findings affirm the shift from teacher-centered to learner-centered approaches in most schools, aligning with the findings of previous studies [43]–[45]. However, ongoing mentoring and support are essential for sustaining these practices over time, as the shift requires continuous professional development and institutional backing.

The use of media and resources showed some variability across schools, with scores ranging from 3.3 to 3.7. SD Inpres 1 Tondo scored the highest (3.7), while Elementary School Tondo recorded the lowest (3.3). This discrepancy indicates uneven access to and proficiency with instructional technology. Teachers are encouraged to improve their digital literacy, as the importance of ICT competencies in modern education has been highlighted by previous studies [13], [46]–[48]. Although some teachers effectively integrate both digital and non-digital tools, others face challenges related to infrastructure, creativity, and technical skills. Addressing these issues could improve the inclusivity and overall quality of PJOK instruction, making the learning environment more engaging and accessible for all students.

Assessment received the highest scores, ranging from 3.6 to 4.0. Elementary School Tondo and Elementary School Lasoani performed particularly well (4.0 and 3.9), reflecting strong competence in both formative and summative assessments. Teachers in these schools have developed and implemented assessment tools that evaluate not only student performance but also learning processes and behavioral development. These results align with the argument that comprehensive assessment in physical education serves both diagnostic and developmental purposes [26], [49], [50]. The high scores indicate that teachers are increasingly aligning assessments with competency-based outcomes, contributing to more accurate and holistic evaluations of student learning.

This indicator received the lowest scores, ranging from 2.5 to 3.3, with Elementary School 1 Tondo scoring the lowest (2.5). Key challenges include limited understanding of the Independent Curriculum, insufficient facilities, and inconsistent administrative support [2]–[4], [51], [52]. Conversely, Elementary School Tondo and Elementary School Lasoani demonstrated higher readiness levels, suggesting that more effective collaboration, leadership, and access to training are key to overcoming these constraints. The findings support the notion that institutional support and shared leadership are crucial for educational change and success [53], [54]. It is essential to address these barriers to ensure that all schools can fully implement the Independent Curriculum.

All schools achieved high scores in this area, ranging from 3.8 to 4.0, indicating that teachers have received substantial support through workshops, technical mentoring, and government-led training programs focused on the Independent Curriculum. Sustained professional development is vital for improving curriculum implementation [2], [3], [55], [56].The results confirm that this support has translated effectively into teaching practices, enhancing teacher confidence and the overall quality of PJOK instruction across schools in Palu City. This highlights the importance of continued professional development to ensure long-term success and alignment with curriculum goals.

The overall implementation of PJOK instructional strategies in Palu's elementary schools under the Independent Curriculum can be categorized as Good to Very Good. Teachers demonstrated strong competencies in planning, assessment, and training participation, but improvements are still needed in media utilization and addressing challenges. These findings emphasize the importance of systematic evaluation to ensure effective curriculum implementation and highlight the critical role of continuous institutional support, leadership engagement, and collaboration among educational stakeholders. The results suggest that while significant progress has been made, the effectiveness of the curriculum will continue to rely on addressing infrastructural limitations and enhancing the support available to teachers.

4. CONCLUSION

Based on the analysis of the implementation of PJOK teaching strategies under the Independent Curriculum in five elementary schools in Palu City, this study concludes that PJOK teachers have successfully implemented most of the core principles of the curriculum. The average scores across six indicators, ranging from "agree" to "strongly agree", indicate a strong understanding and progressive application of the curriculum. Teachers have also benefited from professional support through programs like Guru Penggerak and learning communities, which enhanced their ability to design and apply both formative and summative assessments. However, the success of this implementation is influenced by external factors such as facility availability, infrastructure, leadership support, and teacher collaboration. Limitations in teaching aids, technological constraints, and time pressures also hinder progress. Schools like Elementary School Inti Tondo and Elementary School Lasoani performed better due to stronger leadership and resources, while Elementary School 1 Talise and Elementary School 1 Tondo faced more challenges. This study highlights the importance of sustained leadership, teacher development, and adequate resources in successful curriculum implementation. Policy implications include prioritizing investments in infrastructure, fostering collaboration, and supporting ongoing professional development. Future research should examine the long-term impact of these implementations and explore how community engagement can support sustainable curriculum changes.

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AUTHOR CONTRIBUTIONS

K contributed to the conceptualization of the research and the drafting of the initial manuscript. HI, MTMD, MS, and MU contributed to the development of the research instruments and was involved in the data collection process. Sutarto was responsible for data processing and analysis. All authors participated in the review and editing of the manuscript and approved the final version of the article.

CONFLICTS OF INTEREST

The author(s) declare no conflict of interest.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that no artificial intelligence (AI) tools were used in the generation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

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