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Optimizing the Integration of Meaningful, Mindful, and Joyful Learning in Physical Education: Creating Immersive and Enjoyable Learning Experiences

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ABSTRACT

Traditional teacher-centered approaches continue to dominate physical education, which restricts active participation and diminishes student motivation. These methods are less effective in supporting holistic development, especially in post-pandemic settings that require innovative, student-centered strategies. despite this necessity, there exists a deficiency of thorough empirical study about the implementation of deep learning in physical education. This study investigates the efficacy of incorporating Meaningful, Mindful, and Joyful (M-M-J) Learning in physical education to improve student engagement and academic performance. A quasi-experimental design featuring a non-equivalent control group pretest-posttest was conducted with 100 eighth-grade students in Sorong City. The experimental group received instruction using the M-M-J Learning approach, while the control group followed conventional methods. Both groups had pretest and posttest evaluations. Quantitative data were examined utilizing gain scores, t-tests, and Cohen's d. Qualitative reflections yielded supplementary insights. The experimental group attained superior posttest results (M = 83.10) compared to the control group (M = 64.80), exhibiting a substantial effect size (d = 4.95). Qualitative research also shown heightened motivation and classroom engagement. Conclusion: The M-M-J approach was more effective than traditional methods. These results support curriculum innovation that fosters active, reflective, and enjoyable learning, and present a promising model for post-pandemic physical education.

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INTRODUCTION

Physical education plays a vital role in shaping students' character and life skills (Fletcher & Ní Chróinín, 2022) Beyond improving physical fitness, it also fosters essential values such as cooperation, discipline, and responsibility, while supporting mental and

emotional well-being (Beni et al., 2021) Effective learning supports students' holistic development by addressing psychomotor, cognitive, and affective domains. Despite the exploration of diverse methodologies, including blended and cooperative learning, the thorough integration of Meaningful, Mindful, and Joyful (M-M-J) Learning in Physical Education is still constrained. This study's originality is seen in its systematic incorporation of M-M-J within the PE curriculum. The urgency arises from the post-pandemic necessity for new and student-centered methodologies. (Beni et al., 2022; Fletcher et al., 2021) Such strategies frequently demonstrate diminished efficacy in cultivating students' interest and motivation to participate in physical education activities. (Susanti et al., 2024). Therefore, physical education instructors must develop more innovative and flexible pedagogical approaches to cater to the varied capabilities of students. This aligns with Asta Cita No. 4, which stresses improving human resources, research, technology, education, health, and sports success. It also fits with SDG No. 4, which is about making sure that everyone has access to good education.

Earlier studies have proven that the blended learning approach, cooperative models, and problem-based learning can keep students more engaged. (Dawadi et al., 2021; Masuku et al., 2020). The integration of technology in education has become significant(Doolittle et al., 2023; J. Liu et al., 2024), particularly during the COVID-19 pandemic. This necessitated the development of an innovative and inclusive approach in physical education to efficiently achieve learning objectives.

A novel approach is deep learning, which integrates the elements of mindful, meaningful, joyful learning (Cronqvist, 2024; Wang et al., 2023). It strives to make learning more meaningful for students, reflective for students, and attractive to students (Chróinín et al., 2023; Kovač et al., 2023) As proposed in new learning paradigms, Mindful Learning fosters the awareness and attentiveness of learners in the process of learning (Bordunos et al., 2024) while Meaningful Learning connects subject matter with real-life contexts (Fletcher & Ní Chróinín, 2022). Joyful Learning, on the other hand, focuses on creating a fun and motivating learning atmosphere (E. Liu et al., 2022; Mo et al., 2024). It would dwell on creating a playful and motivating learning environment. The integration of these three components is expected to enhance students' conceptual understanding, creativity, and motivation (Butar-butar et al., 2020).

The use of Deep Learning in physical education has yet to be widely adopted, and for its successful application, the readiness of teachers' competencies must first be achieved. (Angga & Sari, 2025; Cui et al., 2025) Therefore, this study seeks to discuss the utilization of Deep Learning in physical education learning as a means through which student engagement can be improved and also as a means through which the overall quality of meaningful learning can be enhanced (Lobo, 2025; Mustafa et al., 2025).

Several prior research have emphasized the advancement of physical education that is more significant, pleasurable, and introspective. Research (Beni et al., 2021; Delgado-Montoro et al., 2022) Executed Meaningful Physical Education in primary schools and evidenced its efficacy in enhancing student engagement and learning experiences. Nevertheless, these studies were brief, included small sample sizes, and lacked thorough

integration within the context of Physical Education, hence limiting the generalizability of their findings. Furthermore, (Ningsih, 2024) employed a game-based learning approach to cultivate an engaging teaching environment in Physical Education. The study indicated heightened student interest and engagement; nevertheless, it lacked quantitative assessments of learning outcomes. Similarly, (D'Agostino et al., 2021) Administered a survey to 60 Physical Education instructors in the United States regarding the critical attributes of distance learning platforms during the COVID-19 epidemic. Their findings underscored the necessity for more tailored online platforms to guarantee learning quality, while the study did not evaluate the efficacy of these platforms on student outcomes. Within the Indonesian setting, (Octavia et al., 2022) discovered that students' engagement in online Physical Education throughout the epidemic was comparatively minimal. However, the study was limited to a descriptive survey in a single school without any intervention or solution. In addition, (Azevedo et al., 2024) An action research study involving six pre-service Physical Education teachers shown that reflection across three cycles of facilitated guidance enhanced reflective skills, however the facilitator's involvement may have added bias. In a comparable manner, (Setiawan, 2022) Emphasized the significance of professional training through an analysis of the views of 13 Physical Education instructors, highlighting three principal themes: reconceptualizing the objectives of physical education, evaluating effective pedagogical methods, and formulating future pedagogical strategies. Nonetheless, this study relied solely on teacher self-reports and was not complemented by classroom observations.

Building on these studies, it is evident that although various efforts have been made to promote Physical Education learning that is more meaningful, enjoyable, and reflective, limitations remain in terms of context, sample size, methodology, and the generalizability of findings. Consequently, the originality of this study resides in the design and execution of a curriculum that thoroughly incorporates Meaningful, Mindful, and Joyful Learning into physical education. This effort aligns with the Ministry of Primary and Secondary Education's goal, which underscores the critical importance of deep learning in improving educational quality (Kemdikbudristek, 2025). This research aims to rectify the deficiencies of other studies by offering robust empirical data about the efficacy of deep learning methodologies in physical education, especially in more extensive and varied contexts (Zhang et al., 2020).

This study formulates the research problem as follows: How can the Deep Learning strategy (Meaningful, Mindful, and Joyful Learning) be applied in physical education to enhance student engagement and elevate the quality of meaningful learning.

METHODS

Research Design

This study employs a mixed-method approach with a quasi-experimental pretest-posttest nonequivalent control group design (Okpatrioka Okpatrioka, 2023) Two groups were involved: the experimental group, which received instruction through Physical

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Education modules based on Meaningful, Mindful, and Joyful Learning (M-M-J), and the control group, which followed conventional learning methods. The quantitative method evaluated students' academic outcomes and participation, while the qualitative method explored their learning experiences.

Population and Sample

The study population consisted of eighth-grade students from junior high schools in Sorong City, Southwest Papua. The sample was selected using purposive and cluster selection techniques, comprising 100 students (50 in the experimental group and 50 in the control group). The criteria for participation were: students must actively participate in physical education, have no substantial physical limitations, and obtain agreement from their parents and educators.

A variety of instruments were utilized to gather both quantitative and qualitative data. All instruments underwent validation and reliability assessments to guarantee the correctness and consistency of the data:

1. Observation Sheets: These were utilized to assess student involvement and conduct throughout the educational process. Observers documented elements like active engagement, collaboration, mindfulness, and signs of joyful learning (Bluestein & Goldschmidt, 2021)
2. A closed-ended questionnaire on a Likert scale was administered to assess students' perceptions of their learning experiences. The questionnaire addressed aspects of Meaningful Learning, Mindful Learning, and Joyful Learning (Stumke et al., 2023; Yu & Guo, 2023).
3. Learning Outcome Assessment: This assessment was created to evaluate students' conceptual comprehension and physical education competencies.
4. Semi-structured interviews were undertaken with children and teachers to obtain comprehensive insights into their experiences post-intervention. Teacher interviews concentrated on perceptions regarding the application of the technique, whereas student interviews examined their learning experiences and reflections (Mashuri et al., 2022).

Research Procedure

The research methodology was executed in several primary phases as outlined below:

1. Preparation involves the creation of learning modules, validation of assessment tools, and interaction with educational institutions.
2. Pretest - Assessment of pupils' preliminary learning outcomes and motivation.
3. The experimental group engaged in M-M-J-based learning for 8 to 10 weeks, whereas the control group adhered to traditional learning approaches.
4. Posttest and Data Collection - Assessment of final learning outcomes, distribution of questionnaires, and execution of interviews with students and educators.
5. Data Analysis — Quantitative data were subjected to t-tests and ANOVA, whereas qualitative data were assessed via theme analysis and triangulation.

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Data Analysis Techniques

Quantitative data were evaluated descriptively to offer an overview of student learning outcomes and engagement. Inferential statistical analyses were performed to ascertain significant differences between the experimental and control groups, including paired t-tests, independent t-tests, and ANOVA or ANCOVA to account for potential confounding variables (Buabeng-Andoh, 2012; Gattermann et al., 2021) impact size (Cohen's d) and normalized gain were computed to assess the magnitude of the intervention impact (Karasova & Nehyba, 2023)

Instrument Validity and Reliability

The validity was assessed via the Pearson Product-Moment correlation: valid if $r_{count} > r_{table}$

The reliability was assessed by Cronbach's Alpha: → reliable if $a \geq 0.7$.

Qualitative Data Analysis

Qualitative data were examined by thematic analysis, isolating significant comments from interviews and observational notes, thereafter categorized into themes. Data triangulation was performed by juxtaposing results from interviews, observations, and quantitative analyses (Karasova & Nehyba, 2023) Semi-structured interviews with educators and students were subsequently analyzed utilizing thematic evaluation rubrics (Ismail, 2021) Each interview transcript is examined according to the established primary themes: Meaningful Learning, Mindful Learning, and Joyful Learning. Each transcript was analyzed across three main themes—Meaningful Learning, Mindful Learning, and Joyful Learning—scored on a scale of 1 to 5 based on relevance, depth, and reflection.

Table 1.
Assessment Score

criterion	score
Statements that are irrelevant or very superficial to the theme	1
Relevant but very limited or less exploratory	2
Relevant to general explanations but lacking in detail	3
Relevant and detailed enough with illustrations or examples of real experiences	4
Highly relevant, detailed, reflective, and demonstrate deep understanding	5

Two independent evaluators (inter-raters) assessed the data individually, followed by a comparison of the results. Should a substantial discrepancy in scores be identified (>1 point), a debate ensued to achieve consensus. The mean of the two assessors' scores was subsequently utilized as the final score (Tembo & Carlson, 2019)

RESULTS AND DISCUSSION

This section delineates the outcomes of the quantitative data analysis derived from the use of the Meaningful, Mindful, and Joyful Learning (M-M-J) modules in the experimental group compared to traditional learning in the control group. The intervention's efficacy was evaluated by analyzing student learning outcomes as indicated by the pretest and posttest results. The research sample comprised 100

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eighth-grade students from junior high schools in Sorong City, with 50 students assigned to the experimental group and 50 to the control group.

Descriptive Statistics of Learning Outcomes

Descriptive analysis offers a summary of the pretest and posttest outcomes in both groups.

Table 2.
Descriptive Statistics of Learning Outcomes

Grup	*N*	Pretest (SD)	Posttest (SD)	Gain
Control	50	46.90(7.07)	64.80(6.74)	17.90
Experiment	50	47.20(6.37)	83.10(7.73)	35.90

- The average pretest scores for the control and experimental groups were 46.90 and 47.20, respectively, suggesting that the students' baseline talents were comparably comparable prior to the intervention.
- Posttest: Both cohorts shown substantial enhancement. The control group attained an average posttest score of 64.80, whereas the experimental group reached 83.10.

Normalized Gain

The Normalized Gain (g) was computed to assess the efficacy of learning enhancement irrespective of beginning scores.

Table 3.
Normalized Gain

Group	Pretest Mean (Spre)	Posttest Mean (Spost)	*Normalized Gain* (g)	Interpretation
Control	46.90	64.80	0.34	Moderate Improvement
Experiment	47.20	83.10	0.68	Moderate Improvement

The experimental group attained a Normalized Gain value of g = 0.68, nearing the classification of significant progress. The M-M-J intervention was approximately twice as effective in enhancing learning outcomes relative to the control group (g = 0.34).

Hypothesis Test (Inferential T-Test)

Effectiveness of Internal Improvement (Paired T-Test)

Paired t-tests were performed to compare the pretest and posttest results within each group to ascertain whether there was a significant enhancement in learning outcomes following the intervention.

Table 4.
Paired T-Test Results

Group	T-Statistics	$\mathcal{P}$-value (Sig.)	Conclusion ($\mathcal{P}$ <0.05)
Control	-15.65	1.07×10^{-20}	Significant Improvement
Experiment	-24.33	5.18×10^{-29}	Very Significant Improvement

The results demonstrate that both the conventional technique and the M-M-J model produced substantial enhancements in student learning outcomes.

Comparison of Effectiveness Between Groups (Independent T-Test)

An independent t-test was conducted to compare the posttest scores of the experimental and control groups, assessing the statistical significance of their changes.

Table 5.
Independent T-Test Results

Test	T-Statistics	$\mathcal{P}$ -value (Sig.)	Conclusion ($\mathcal{P}$ <0.05)
Posttest (Experiment vs Control)	-13.75	1.35×10^{-24}	**Very Significant Difference**

The research revealed that the posttest results of the experimental group were markedly superior than those of the control group. This verifies that M-M-J-based learning modules were superior in enhancing student learning results relative to traditional techniques.

Practical Impact Assessment (Cohen's d)

Cohen's d was employed to quantify the magnitude of the intervention's practical effect.

$$d = \frac{M_{post} - M_{pre}}{SD_{pooled}}$$

Table 6.
Effect size (Cohen's d) results

Group	Cohen's d	Interpretation
Control	3.06	Large Effect
Experiment	4.95	Large Effect

Despite both groups exhibiting significant impacts, the analysis of Cohen's d values indicated that the influence of the M-M-J intervention on the experimental group (d = 4.95) was much superior than that of traditional learning (d = 3.06). This indicates that the M-M-J model produced a much stronger practical improvement in learning outcomes.

Results of Qualitative Data Analysis

The qualitative phase of this research aimed to explore the learning experiences of students and teachers after the implementation of the M-M-J module, providing deeper insights to complement the quantitative findings. Data were gathered via classroom observations and semi-structured interviews with teachers and students. Thematic analysis and triangulation were utilized to establish the legitimacy of the results.

Categorization of Learning Experiences

Utilizing thematic analysis and interview scoring (employing thematic evaluation rubrics on a scale of 1 to 5), the learning experiences of students in the experimental group were classified as follows:

Table 7.
Categorization of Learning Experiences

Learning Dimension	Categories Experience	Score Range (Expectation)
Meaningful Learning	Very High	4.21 - 5.00
Mindful Learning	High	3.41 - 4.20
Joyful Learning	Very High	4.21 - 5.00

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These findings corroborate prior research highlighting the significance of meaningful and joyful learning in augmenting engagement (Fletcher & Ní Chróinín, 2022; Mo et al., 2024). This study builds upon previous research by showing that the thorough integration of M-M-J resulted in significantly enhanced learning results, with an impact size nearly double that of traditional techniques. This suggests that student-centered physical education enhances motivation and cultivates a more profound conceptual understanding. 2. Conclusions Derived from Fundamental Learning Dimensions.

Meaningful Learning

Students in the experimental group exhibited a heightened comprehension of the applicability of physical education content to their everyday lives. Interview findings revealed that students could connect motor skills and health concepts to real-world scenarios, including teamwork in daily life. Educators indicated that pupils were not solely concentrated on psychomotor skills but also actively participated in cognitive and affective dialogues, so enhancing their conceptual comprehension.

Mindful Learning

This dimension emphasized students' awareness and concentration throughout the learning process. Observations indicated that pupils in the M-M-J group demonstrated enhanced concentration, reduced distractions, and improved compliance with instructions. Interviews indicated that students cultivated a heightened awareness of energy management, breathing methods, and emotional regulation during exercise, which favorably impacted skill enhancement.

Joyful Learning

Educators and learners concurred that the M-M-J module fostered an enjoyable and low-pressure educational atmosphere. The game-centric and challenge-driven activities motivated pupils to investigate and engage actively. Research diaries and observations documented a significant increase in participation, particularly among students who had previously been inactive. Students expressed that they "enjoyed" the physical education lessons, illustrating the effectiveness of Joyful Learning.

Data Triangulation

The qualitative analysis offered causal elucidations for the quantitative results:

- Joyful Learning enhanced student motivation and consistent participation.
- Mindful Learning improved focus and retention of instructions, which directly influenced technical accuracy.
- Meaningful Learning strengthened conceptual understanding and values, as reflected in improved test scores emphasizing psychomotor, cognitive, and affective aspects.

The qualitative results affirm that the incorporation of Meaningful, Mindful, and Joyful Learning enhanced quantitative outcomes and converted the learning experience into a more contemplative, engaged, and joyful one.

This study has demonstrated that optimizing the integration of Meaningful, Mindful, and Joyful Learning (M-M-J) models in physical education surpasses traditional techniques in enhancing learning results and the overall quality of student experiences. The quantitative findings revealed that although both groups shown significant improvements, the impact of the M-M-J intervention was markedly superior to that of conventional approaches. The higher Cohen's d value of 4.95 compared to 3.06 and the nearly doubled Normalized Gain value of 0.68 against 0.34 serve as evidence of this.

The qualitative data corroborates and elucidates these conclusions. Thematic analysis and triangulation indicated that enhancements in quantitative outcomes were directly impacted by the engaging and pleasurable learning experiences fostered by the M-M-J paradigm.

- Meaningful Learning: The M-M-J approach adeptly linked subject matter to students' real-life experiences, facilitating their comprehension of the importance of motor skills and health concepts beyond the classroom environment. This improvement in conceptual comprehension was seen in elevated test scores, highlighting not just psychomotor but also cognitive and affective aspects.
- Mindful Learning: Participants in the experimental group exhibited enhanced concentration, less distractions, and improved compliance with directives. This increased self-awareness allowed them to manage their energy and approaches more efficiently, positively influencing both technical precision and instruction retention.
- Joyful Learning: This element was the primary catalyst for heightened motivation and engagement. The stimulating and relaxed educational atmosphere motivated pupils to investigate, cooperate, and engage more actively, including those who had hitherto been inactive. Both educators and learners emphasized the pleasurable environment as a principal advantage of the M-M-J methodology.

These findings corroborate prior studies highlighting the significance of innovative and inclusive strategies to enhance student engagement. This study makes a significant contribution by presenting the design and implementation of a curriculum that comprehensively integrates M-M-J, thereby demonstrating the critical role of deep learning in promoting quality education.

This study, while yielding promising results, has numerous limitations that must be recognized. The research population consisted solely of eighth-grade junior high school students in Sorong City, Southwest Papua, hence limiting the generalizability of the findings. Consequently, further research is advised to investigate the use of the M-M-J model in a wider array of physical education settings, encompassing various educational tiers and geographical areas, to further corroborate and enhance these findings.

The findings substantiate that the incorporation of Meaningful, Mindful, and Joyful (M-M-J) Learning surpasses traditional methods in Physical Education. This was

evidenced by markedly elevated posttest scores, a greater normalized gain, and a more substantial effect size in the experimental group relative to the control group.

These findings corroborate prior research emphasizing the significance of meaningful and enjoyable learning in enhancing student engagement and motivation (Fletcher & Ní Chróinín, 2022; Mo et al., 2024). This study builds upon previous research by demonstrating that the thorough integration of M-M-J not only augmented motivation but also increased conceptual comprehension and technical precision. The considerable effect size (d = 4.95) signifies that this model significantly influenced students' learning results, nearly double those of traditional methods.

From a qualitative standpoint, the M-M-J model effectively generated immersive and pleasurable learning experiences. Students indicated enhanced correlations between physical education content and everyday life (meaningful learning), heightened concentration and self-awareness during activities (mindful learning), and higher enjoyment and engagement (joyful learning). These results emphasize that innovative teaching strategies that combine cognitive, affective, and psychomotor aspects are critical for post-pandemic Physical Education.

This study theoretically endorses the deep learning paradigm, promoting student reflection, meaningful engagement, and enjoyment in the learning process (Cronqvist, 2024; Wang et al., 2023). The findings indicate that physical education teachers ought to incorporate reflective, contextual, and game-based methodologies to enhance student involvement and outcomes.

CONCLUSION

This study illustrates the significance of incorporating Meaningful, Mindful, and Joyful Learning (M-M-J) into physical education. The results demonstrate that the M-M-J strategy enhances students' motivation, engagement, and overall learning experiences. Notwithstanding its significance, the study is constrained in scope and lacks exploratory profundity, especially regarding wider contextual applications. The study utilized a limited sample in a particular regional context, hence constraining the generalizability of the findings. Nonetheless, the ramifications for both theory and practice are substantial, as the findings underscore the necessity of implementing more student-centered, reflective, and pleasant methodologies in physical education. Subsequent study ought to incorporate larger and more heterogeneous populations, utilize mixed-methods approaches, and investigate long-term effects to yield more substantial findings. Extending this concept across diverse cultural and educational contexts will enhance its validity and contribute to the worldwide dialogue on creative and significant physical education.

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