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Sipemandu-GPT: A Digital Training Model for 21st Century PE Teacher Professionalism

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ABSTRACT

Purpose – This study aims to develop a technology-based training design for physical education teachers through the Sipemandu-GPT model to enhance teacher professionalism.

Methodology – This study employed a research and development (R&D) approach, adapting the Borg & Gall development model. The initial stage began with a preliminary study through interviews and observations involving KKGOMI teachers in Jepara Regency. The findings revealed that the training previously received was monotonous, lacked contextual relevance, and had not integrated technology. Consequently, a prototype training model based on blended learning was developed, combining online components (interactive modules, tutorial videos, virtual discussion forums) and offline components (teaching simulations, group discussions, written reflections).

Findings – Validation by three experts indicated that the training design fell within the "valid" to "highly valid" category, with several improvement notes, such as adding visual flowcharts and providing worksheets. After revisions, a limited trial was conducted involving 14 teachers. The results showed an increase in average scores from the pre-test (55.6) to the post-test (84.5), with an average improvement of 28.9 points. These findings suggest that the Sipemandu-GPT-based training effectively enhances the competence and professionalism of physical education teachers.

Contribution – Providing a flexible and contextual technology-based training model to support teachers' professional development, particularly in responding to the demands of the *Kurikulum Merdeka* and the digital transformation of education.

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INTRODUCTION

The availability of qualified subject teachers remains a critical issue in the Indonesian education system, particularly in madrasah ibtidaiyah (Islamic elementary schools). Among various subjects, Physical Education (PE), referred to as *Pendidikan Jasmani, Olahraga, dan Kesehatan* (PJOK) in the Indonesian curriculum, has received less attention regarding teacher specialization and professional development. This issue is especially prominent in Jepara Regency, where most madrasahs operate as private institutions and lack PE teachers with relevant academic and professional qualifications. According to data from KKGOMI Jepara (Kelompok Kerja Guru Olahraga Madrasah Ibtidaiyah), only 12 out of 98 affiliated madrasahs have certified PJOK teachers (Marwanto, 2024). Despite their limited training and pedagogical background, the rest rely on generalist classroom teachers to deliver PE lessons.

This condition leads to suboptimal learning processes in PE classes. Studies have shown that teachers with insufficient subject knowledge emphasize drills and control rather than conceptual understanding and meaningful physical activity (Morgan & Hansen, 2008; Tsangaridou, 2005, 2012). The situation in Jepara reflects a systemic challenge in many parts of Indonesia, where teacher deployment does not always align with academic qualifications. These challenges are exacerbated by the fact that most teachers in private madrasahs are non-civil servants (*guru non-ASN*), often receiving lower compensation and fewer opportunities for professional development (Rozi et al., 2023; Shidiq et al., 2022).

Beyond teacher quality, various studies underscore the influence of additional factors on educational outcomes, such as school infrastructure (Pramono, 2012; Prasetyo, 2020), curriculum alignment (Fadila et al., 2021; Mustafa & Dwiyogo, 2020), and policy support (Gilang Ramadhan et al., 2020). Nonetheless, the competence of teachers remains a primary determinant in the success of instructional delivery (Anwar, 2018; Apandi, 2017; Muna, 2017; Raibowo et al., 2019). In the context of physical education, where teaching is closely linked to practice, movement, and engagement, the absence of professionally trained instructors can lead to a significant reduction in instructional quality and student learning motivation (Capella-Peris et al., 2021; Chang et al., 2021; Fletcher et al., 2013).

Efforts to bridge the competency gap through in-service training have shown mixed results. Although several initiatives have been implemented by local education offices or in collaboration with universities, these programs often adopt conventional face-to-face models that are time-bound and content-heavy (Elvianasti et al., 2021; Wahyuni et al., 2021). Teachers in Jepara frequently report that such training sessions are monotonous, lack contextual relevance, and impose logistical burdens, particularly regarding travel costs and scheduling conflicts (Marwanto, 2024). These constraints highlight the need for a more accessible and practical training framework tailored to the unique characteristics of madrasahs in rural and semi-urban settings.

To address these issues, there is a growing interest in flexible training systems that incorporate *blended learning* (a mix of online and offline instruction) and *andragogical principles*, emphasizing adult learners' autonomy and prior experience. Blended learning has been recognized as an effective solution for teacher development, especially in geographically dispersed and resource-constrained environments (Lin et al., 2023; Phillips & Cavanaugh, 2011). Moreover, andragogy as introduced by Knowles promotes self-directed learning, active participation, and experiential engagement, making it highly suitable for in-service teachers juggling multiple responsibilities.

In the context of Jepara, where most madrasahs now have internet connectivity, implementing technology-assisted training becomes increasingly viable. The digital transformation of education post-pandemic has also accelerated teachers' exposure to online tools, creating a favorable environment for adopting hybrid learning models (Aravind, 2024; Can et al., 2024; Wang et al., 2023). However, despite this potential, there remains a lack of structured, context-specific training models that combine blended learning and andragogy for PE teachers at the primary school level.

This study responds to this gap by developing a training innovation named Sipemandu-GPT (*Sistem Pelatihan Mandiri Terpadu–Guru PJOK Terampil*), a self-directed, blended learning-based training model

designed explicitly for PE teachers in madrasah ibtidaiyah. The model is built upon three core elements: (1) digital and modular training content aligned with the Merdeka Curriculum and 21st-century skills; (2) interactive online and offline learning processes; and (3) ongoing mentoring from facilitators or senior teachers. The novelty of Sipemandu-GPT lies in its integration of theory and practice, scalability, and responsiveness to local educational contexts.

Furthermore, the model aligns with national priorities for teacher professional development as outlined in government programs such as *Program Guru Penggerak* and *Platform Merdeka Mengajar*. These emphasize the need for teacher autonomy, innovation, and continuous improvement—principles embedded in the Sipemandu-GPT framework.

Thus, the primary objective of this study is to design, validate, and test the effectiveness of the Sipemandu-GPT training system. By targeting PE teachers in Jepara's madrasahs, this research contributes theoretically and practically to the discourse on teacher professionalization in under-resourced Islamic educational institutions. It offers a potential blueprint for replicable training interventions in other regions facing similar challenges in teacher supply, training relevance, and instructional quality.

METHODOLOGY

Research Design

This study employed a Research and Development (R&D) approach. The R&D process in this study consisted of two main stages: the research stage and the development stage. This method aimed to develop an innovative training design called Sipemandu-GPT, intended for KKGOMI teachers in Jepara Regency.

Participants

The subjects of this study are the teachers who are members of KKGOMI in Jepara Regency and who participated in developing and evaluating the training design. The population in this study consists of all teachers who are members of KKGOMI in Jepara Regency. The sampling technique used is purposive sampling, where participants are selected based on their active involvement in previous training and their availability to participate in the development and evaluation process of the product.

Instruments

The instruments used in this study included interview guidelines and observation sheets for initial data collection, validation sheets for experts and practitioners to assess the feasibility of the training design, as well as pre-test and post-test questionnaires to measure the effectiveness of the Sipemandu-GPT training from the teachers' perspective.

Research Procedures and Time Frame

The research phase began with interviews and observations conducted on February 24, 2024, at MIN 1 Jepara to identify the current training practices implemented by KKGOMI teachers. This was followed by a literature review to examine existing training designs, including the Lynton and Pareek model, which divides training into three main phases (Som et al., 2020). Two field studies were conducted on January 10 and February 24, 2024, to assess participants' needs and challenges. Based on the preliminary findings, a draft training design was developed, adopting the Lynton and Pareek model, considering transportation efficiency, Wi-Fi availability, and ease of access to training materials.

In the development phase, internal testing involved one physical education expert (Professor) and two practitioners (PhDs) with over five years of experience. They were asked to provide assessments through a questionnaire. If necessary, the design would be revised based on feedback from the validators, and this iterative process would continue until the design was deemed valid. Once validated, the final product, the Sipemandu-GPT Module, will be produced, outlining the step-by-step implementation of the training. Finally, a field evaluation was conducted using a one-group pre-test and post-test design, in which teachers completed

questionnaires before and after using the module to assess its impact.

Analysis Plan

Quantitative data from the pre-test and post-test questionnaires will be analyzed using comparative descriptive statistics. The analysis results will reveal differences in teachers' perceptions or experiences before and after participating in the training using the Sipemandu-GPT Module.

Scope and Limitations

The scope of this study is limited to the development and trial implementation of a training design for KKGOMI teachers in Jepara Regency. The findings may not be generalizable to other regions without appropriate adjustments. Other limitations include the small sample size and the limited timeframe, as the study was conducted solely in the year 2024.

FINDINGS

Research Phase

This preliminary research phase involved data collection through in-depth interviews and systematic classroom observations, aiming to understand the current state of professional development for physical education (PE) teachers and identify training gaps. The findings (Table 1) indicated that although many teachers had participated in previous training programs, these were often perceived as monotonous, lacking relevance to real classroom challenges, and not integrated with current technological advancements. One teacher noted, "*The previous training felt repetitive and did not provide any tools I could directly use in my classroom*" (Marwanto, 2024).

In addition, logistical challenges such as limited time due to full teaching loads, high transportation costs, and lack of access to contextual teaching materials further hindered participation and effectiveness. These factors decreased teacher motivation and limited the applicability of training outcomes to classroom practices. As a result, there is a strong need for a more flexible and contextually appropriate training model, particularly for madrasah teachers in rural and underserved areas like Jepara.

These insights were the foundation for designing the Sipemandu-GPT prototype, which was intentionally aligned with teachers' real-world constraints and pedagogical needs. The model incorporates blended learning to offer flexibility and ensures training content directly applies to PJOK instruction.

Table 1. Preliminary Study Results

Training Needs	Challenges	Suggestions from Teachers and Coordinators
Most teachers reported never receiving technology-based training.	Limited time due to packed teaching schedules.	The training design should be flexible, combining online and offline delivery.
Previous training sessions were monotonous and lacked practical application.	High transportation costs when entirely face-to-face.	Training materials should be independently accessible.
Teachers need training focused on active learning methods and tech use in PJOK.	Lack of contextual and practical teaching materials.	A systematic training guidebook should be provided.

From the above data, it is clear that teachers are open to innovation but require structured, accessible, and efficient training formats. Their feedback indicated a preference for modular training content with opportunities for reflection and application in classroom settings.

Development Phase

Using the above findings, the Sipemandu-GPT prototype was designed to implement blended learning, combining online digital content and face-to-face sessions. This dual mode was chosen to support independent learning while retaining the benefits of in-person mentoring and discussion. The training content was structured around six principal components (Table 2), developed to reflect the principles of andragogy and contextual learning.

Table 2. Training Components

Online (Through the Sipemandu-GPT Website)	Offline (Face-to-Face Sessions)
Interactive Modules: Digital literacy, PJOK pedagogy, and Merdeka curriculum in PDF, videos, and infographics.	Teaching Simulation: Teachers apply lesson plans created from online modules.
Video Tutorials: Step-by-step guidance on active and joyful PJOK teaching.	Small Group Discussions: Address challenges and explore alternative strategies.
Quizzes and Reflections: Check understanding and encourage personal evaluation.	Immediate Feedback: Given directly by facilitators or senior teachers.
Virtual Discussion Forum: Peer-to-peer sharing through WhatsApp.	Documentation & Written Reflection: For evaluation and accountability.

Each component was selected to support the acquisition of knowledge and the development of practical teaching competencies. Combining synchronous and asynchronous learning allowed teachers to manage their time more effectively while engaging with meaningful content.

After the prototype was developed, it was evaluated by three expert validators with backgrounds in PE education, curriculum development, and teacher training. They provided both quantitative scores and qualitative feedback using a structured rubric based on a 4-point Likert scale.

Table 3. Validation Results

Aspect	Maximum Score	Average Score (from 3 Validators)	Summary Notes from Validators
Alignment of design with participants' needs	4	4 (Highly Valid)	"Clarify the explanation in step 2 regarding formative assessment methods."
Clarity of training flow	4	3 (Valid)	"Add a visual representation of the flow at the beginning of the module."
Availability of supporting media	4	3 (Valid)	Include examples of teacher and student worksheets."
Novelty of the concept	4	4 (Highly Valid)	"Already well-developed."
Feasibility of implementation	4	4 (Highly Valid)	"Ensure the module can also be accessed offline."

The validators' (Table 3) input was instrumental in refining the product. Their comments emphasized the need for greater clarity and practical tools within the module. In response, the following revisions were made: a more precise explanation of the formative assessment method was added (with examples), a training flowchart was inserted at the beginning of the module to visualize the sequence of learning, sample Lesson Plans and rubrics were added to the appendix to guide teacher implementation, a downloadable PDF version was created for offline use. These revisions aimed to increase the practicality, clarity, and accessibility of the training module, ensuring it meets the needs of a wide range of PJOK teachers.

Of the 98 madrasahs affiliated with the KKGOMI in Jepara Regency, 14 teachers were selected to participate as research samples. The selection was carried out using purposive sampling based on the following criteria: (1) teachers who actively teach PJOK (not as a professional), (2) willingness to participate

throughout the training process, and (3) representation from both public and private madrasahs. This approach ensured that the selected participants could provide diverse and relevant feedback for the small-scale trial of the training model.

In the small-scale trial (complete results shown in Figure 1), all participants experienced a score increase ranging from 25 to 32 points. The substantial average improvement (28.9 points) indicates that the training designed through Sipemandu-GPT effectively enhanced teachers' understanding of the training material. The low standard deviation range (pre-test: ±4.7; post-test: ±5.1) demonstrates the consistency of the training's success across all participants.

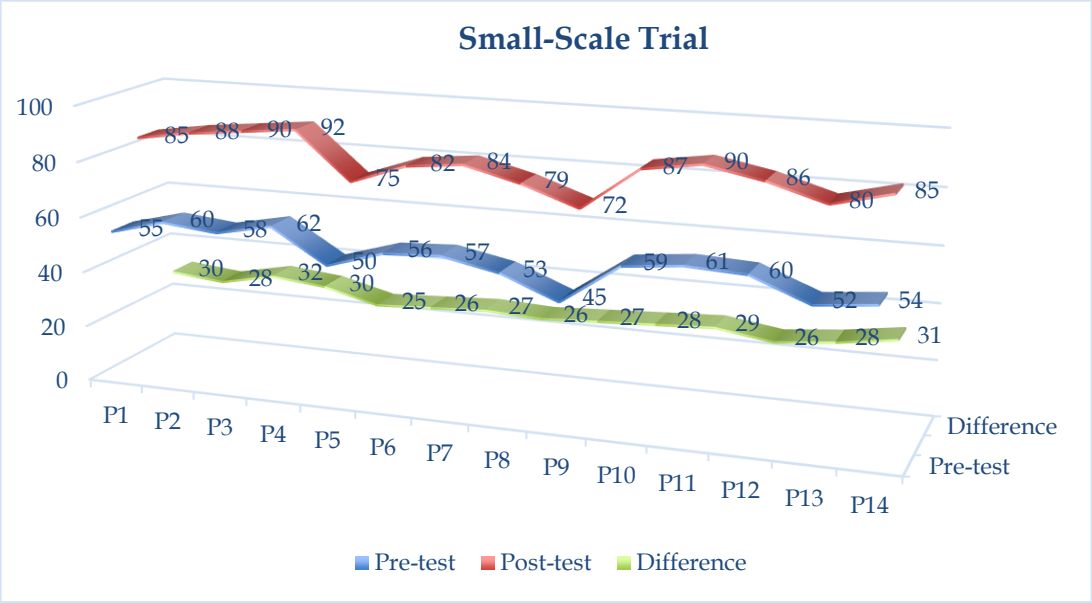

Figure 1. Graph of Pre-test and Post-test Score Results

DISCUSSION

The Sipemandu-GPT training model, which integrates both online and offline learning modes, has demonstrated notable effectiveness in enhancing the competencies and professionalism of Physical Education (PE) teachers, particularly those teaching at madrasah ibtidaiyah (Islamic elementary schools) who often lack a formal background in PE instruction. This finding resonates with a growing body of research that supports blended learning as an impactful method for teacher professional development (Can et al., 2024; Şentürk, 2021; Wang et al., 2023).

In the initial stages of this research, teachers reported that previous training programs were perceived as repetitive and hard to apply in real class situations. This insight reveals a significant gap between the content of conventional teacher training and the actual demands encountered in classroom practice. As stated by one participant:

Previous training sessions were too theoretical. We need practical examples to use in class as soon as tomorrow.

This statement reflects the misalignment between training design and practical application, which affects teacher motivation and the extent to which knowledge gained from training is implemented in schools.

The Sipemandu-GPT model addressed this gap by emphasizing relevance and contextualization. The design of the training modules incorporated real teaching scenarios, task-based assignments, and self-reflection components that allowed teachers to adapt the content to their class contexts. This aligns with contextual teaching and learning (CTL), which emphasizes the need for instructional materials to be directly relevant to the learner's environment (Rogers et al., 2012). Teachers were no longer passive recipients of information but became active participants in shaping their learning experiences.

Another key strength of the Sipemandu-GPT model is its grounding in andragogical theory, which recognizes adult learners as autonomous individuals capable of self-direction, reflection, and applying prior

experiences (Soultati, 2023). This theoretical foundation was evident in how teachers engaged with the digital modules at their own pace, chose specific topics based on their interests or difficulties, and participated in peer discussions without relying entirely on facilitators.

For example, WhatsApp-based discussion groups provided a flexible yet structured platform for collaborative reflection. One teacher noted:

> *The WhatsApp discussions were constructive, especially when I was confused about implementing basic movement tasks in a small space. My peers immediately shared useful tips.*

This collaborative dynamic empowered teachers to learn not only from formal content but also from the practical wisdom of their peers, an essential element of adult learning environments (Clair, 2024; Phillips & Cavanaugh, 2011).

Another significant outcome observed during the implementation of Sipemandu-GPT was the increase in teachers' confidence in using digital learning tools. A previously digitally inexperienced teacher shared:

> *Before this training, I never used videos or digital worksheets in PE. Now, I feel confident about trying them.*

This indicates a shift in self-efficacy and pedagogical practice, in which digital tools become integral to instruction.

This finding is consistent with studies by Latino et al. (2024) and Weeldenburg et al. (2024), which affirm that integrating technology into teacher training positively affects their readiness to use ICT in classrooms (Latino et al., 2024; Weeldenburg et al., 2024). Given the rapidly evolving educational landscape, digital literacy is no longer a supplemental skill but a core component of teacher competence (Robby et al., 2024; Weeldenburg et al., 2024).

The successful integration of digital tools in the Sipemandu-GPT model demonstrates how well-designed online learning can support teachers in remote or under-resourced areas, who might otherwise be excluded from professional development due to cost and distance. The validation phase of the Sipemandu-GPT model involved three expert reviewers representing the fields of physical education, curriculum design, and teacher training. Their feedback was used as a formality and a constructive foundation for model revision. The reviewers provided suggestions such as: enhancing the clarity of formative assessment procedures, adding visual representations of the training flow, and providing sample lesson plans and worksheets. By integrating this feedback, the training design became more robust and user-friendly. For instance, teachers responded positively to the flowchart added in the revised module, stating that It helps to understand the sequence and stages of the training more quickly. This iterative design process is aligned with the principles of design-based research, which advocate for continuous refinement based on stakeholder input (Reeves et al., 2015).

Despite its many advantages, implementing the Sipemandu-GPT model encountered several challenges. These challenges mirror broader findings in the literature about the complexities of blended learning implementation, including difficulties in instructional design, digital access, learner motivation, and maintaining social presence in online settings (Aravind, 2024; Eslit, 2023; Wang et al., 2023). For instance, some participants expressed concern at the outset about their ability to use smartphones for learning, especially when accessing files or watching videos with limited internet bandwidth. To address this, the program provided a downloadable offline version of the module and offered technical support via facilitators. These steps helped lower the threshold for participation and reinforced the principle of accessibility, which is central to equitable education. Additionally, the support of experienced facilitators during the offline sessions proved essential in bridging knowledge gaps and enhancing the social-emotional aspect of learning, which is often lost in purely digital training.

The implications of this study extend far beyond Jepara. The successful implementation of Sipemandu-GPT suggests that similar models can be adapted for other districts facing shortages in subject-specific teachers, especially in rural or religious-based schools where funding and human resources are limited. As Tannehill et al. (2021) and Østerlie et al. (2025) argue, the integration of digital technologies in teacher education is not a luxury but a necessity to ensure sustained professional growth (Østerlie et al., 2025; Tannehill et al., 2021). Moreover, the model's reliance on adult learning principles, flexibility in content delivery, and responsiveness to field realities positions it as a replicable blueprint for teacher professional

development across diverse contexts. Notably, the model aligns with Indonesia's education reform agenda under Kurikulum Merdeka, emphasizing teacher autonomy, differentiated instruction, and digital integration.

The Sipemandu-GPT model has made a meaningful contribution to the ongoing discourse on innovative teacher training in low-resource contexts. It has been shown that teacher development programs can overcome traditional limitations with thoughtful design, participatory methods, and technological integration. However, continuous evaluation, scaling strategies, and cross-regional collaborations are essential to ensure that such models reach broader audiences and remain responsive to the dynamic nature of education in the 21st century.

CONCLUSION

Blended learning-based training for PE teachers through the Sipemandu-GPT model has proven effective in enhancing teacher competence and professionalism. Integrating online and offline learning provides a flexible, adaptive, and contextually relevant training approach aligned with 21st-century educational demands. Incorporating digital tools strengthens pedagogical skills and boosts teachers' self-efficacy and confidence in utilizing technology in physical education instruction. Despite some logistical and motivational challenges, a well-designed and collaborative training model such as Sipemandu-GPT has shown strong potential to overcome these barriers.

However, this study has several limitations. The trial was conducted on a small scale and limited to Madrasah Ibtidaiyah in Jepara Regency, which may not fully represent the diverse educational contexts across Indonesia or Southeast Asia. Additionally, the training outcomes were evaluated primarily through self-report instruments and pre-post tests, without longitudinal tracking of classroom implementation or student learning impact.

Future research is encouraged to apply the Sipemandu-GPT model across broader geographic and institutional settings and assess long-term effects on teaching practices and student outcomes. Expanding this model to other subjects and integrating it with national teacher training programs may also contribute to more systemic improvements in teacher professionalism. Thus, while the Sipemandu-GPT presents a promising step forward, its sustainability and scalability require further investigation and policy support.

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REFERENCES

Anwar, M. (2018). *Menjadi Guru Profesional*. Prenadamedia Group.

Apandi, I. (2017). *Guru Profesional Bukan Guru Abal-Abal*. Deepublish.

Aravind, B. S. (2024). Exploring the Challenges and Opportunities of Blended Learning in a Technology–Enabled Education Environment. *Journal of Effective Teaching and Learning Practices*, *1*(1), 10–19. https://doi.org/10.70372/jetlp.v1i1.2

Can, H. C., Zorba, E., & Işım, A. T. (2024). The effect of blended learning on 21st-Century skills and academic success in the education of physical education teachers: A mixed-methods research. *Teaching and Teacher Education*, *145*, 104614. https://doi.org/10.1016/j.tate.2024.104614

Capella-Peris, C., Martí-Puig, M., Salvador-García, C., & Maravé-Vivas, M. (2021). Social, Personal, and Innovative Competencies Effect of Service-Learning in Physical Education Teacher Education: A Mixed-Methods Analysis. *Frontiers in education*, *6*. https://doi.org/10.3389/feduc.2021.757483

Chang, C. M., Hsieh, H. H., Chou, Y. H., & Huang, H. C. (2021). The relationship between physical education teachers' perceptions of principals' transformational leadership and creative teaching behavior at junior

and senior high schools: A cross-level moderating effect on innovative school climates. *Sustainability (Switzerland)*, *13*(15). https://doi.org/10.3390/su13158184

Clair, R. St. (2024). Andragogy: Past and Present Potential. *New Directions for Adult and Continuing Education*, *2024*(184), 7–13. https://doi.org/10.1002/ace.20546

Elvianasti, M., Roza, L., Anugerah, D., Maesaroh, M., & Irdalisa, I. (2021). Melatih Keterampilan Pedagogi Umum Guru MGMP IPA Jakarta Utara Pasca Covid-19. *Jurnal ABDINUS : Jurnal Pengabdian Nusantara*, *5*(2). https://doi.org/10.29407/ja.v5i2.14714

Eslit, E. R. (2023). *Striking the Balance: An In-depth Examination of the Blended Learning Challenges for Students, Teachers, and Parents*. https://doi.org/10.20944/preprints202307.0779.v1

Fadila, A., Budi, D. R., Listiandi, A. D., Ngadiman, N., & Festiawan, R. (2021). Evaluasi Pembelajaran Pendidikan Jasmani Berbasis Kurikulum 2013 di Sekolah Menengah Atas. *Physical Activity Journal*, *3*(1), 23. https://doi.org/10.20884/1.paju.2021.3.1.4350

Fletcher, T., Mandigo, J., & Kosnik, C. (2013). Elementary classroom teachers and physical education: change in teacher-related factors during pre-service teacher education. *Physical Education & Sport Pedagogy*, *18*(2), 169–183. https://doi.org/10.1080/17408989.2011.649723

Gilang Ramadhan, M., Ma'mun, A., & Mahendra, A. (2020). Implementasi Kebijakan Olahraga Pendidikan sebagai Upaya Pembangunan Melalui Olahraga Berdasarkan Undang-Undang Sistem Keolahragaan Nasional. *JTIKOR (Jurnal Terapan Ilmu Keolahragaan)*, *5*, 69–80. https://ejournal.upi.edu/index.php/JTIKOR/article/view/23824/12103

Latino, F., Romano, G., & Tafuri, F. (2024). Physical Education Teacher's Continuing Professional Development Affects the Physiological and Cognitive Well-Being of School-Age Children. *Education Sciences*, *14*(11), 1199. https://doi.org/10.3390/educsci14111199

Lin, X., Wang, T., Liu, C. J., Deng, L., Wang, Q., Huang, L., Gao, J., Chen, X., & Chen, S. J. (2023). The Impact of Propranolol on the Growth and Development of Children With Proliferative Infantile Hemangioma During Treatment. *Medicine*, *102*(23), e33998. https://doi.org/10.1097/md.0000000000033998

Marwanto, H. (2024). *Hasil Wawancara dan Observasi KKGOMI 2024*.

Morgan, P. J., & Hansen, V. (2008). Classroom teachers' perceptions of the impact of barriers to teaching physical education on the quality of physical education programs. *Research Quarterly for Exercise and Sport*, *79*(4). https://doi.org/10.1080/02701367.2008.10599517

Muna, M. K. (2017). Kompetensi Profesional Guru Pendidikan Jasmani Olahraga dan Kesehatan. *Prosiding Seminar Nasional Profesionalisme Tenaga Profesi*, 209–220.

Mustafa, P. S., & Dwiyogo, W. D. (2020). Kurikulum Pendidikan Jasmani, Olahraga, dan Kesehatan di Indonesia Abad 21. *JARTIKA Jurnal Riset Teknologi Dan Inovasi Pendidikan*, *3*(2), 422–438. https://doi.org/10.36765/jartika.v3i2.268

Østerlie, O., Kristensen, G. O., Holland, S. K., Camacho Miñano, M. J., & Whatman, S. (2025). Digital technology use in physical education teacher education: a scoping review. *Sport, Education and Society*, 1–15. https://doi.org/10.1080/13573322.2025.2474631

Phillips, D. C., & Cavanaugh, J. C. (2011). *Designing and Developing Adult Learning Programs*. Pearson Custom Publisher.

Pramono, H. (2012). Pengaruh sistem pembinaan, sarana prasarana dan pendidikan latihan terhadap kompetensi kinerja guru pendidikan jasmani Sekolah Dasar di kota Semarang. *Jurnal Penelitian Pendidikan*, *29*(1), 7–16.

Prasetyo, D. H. (2020). Pengaruh Minimnya Sarana Dan Prasarana Dalam Pembelajaran Pendidikan Jasmani Olahraga Dan Kesehatan Di Daerah Terpencil. *Prosiding Seminar Nasional S2 POR: Sukses Menulis Tugas Akhir Di Era New Normal*.

Raibowo, S., Nopiyanto, Y. E., & Muna, M. K. (2019). Pemahaman Guru PJOK Tentang Standar Kompetensi Profesional. *Journal of Sport Education (JOPE)*, *2*(1), 10. https://doi.org/10.31258/jope.2.1.10-15

Reeves, K., Ponsford, M., & Gorman, S. (2015). Codes Combined: managing expectations and policy responses to racism in sport. *Sport in Society*, *18*(5), 519–528.

Robby, D. K., Rugaiyah, R., & Mirza, A. M. (2024). *Teacher Professional Competence Development* (pp. 176–181). https://doi.org/10.2991/978-2-38476-240-8_16

Rogers, D. A., Boehler, M. L., Roberts, N. K., & Johnson, V. (2012). Using the Hidden Curriculum to Teach Professionalism During the Surgery Clerkship. *Journal of Surgical Education*, *69*(3), 423–427. https://doi.org/10.1016/j.jsurg.2011.09.008

Rozi, F., Priyono, B., Waluyo, S., A. A. P., & Joseph, J. A. (2023). Physical Education Learning Problematics in Private Madrasah Ibtidaiyah. *Elementary Islamic Teacher Journal*, *11*(1), 57–78. https://journal.iainkudus.ac.id/index.php/elementary/article/view/19232/pdf

Şentürk, C. (2021). Effects of the blended learning model on pre-service teachers' academic achievements and twenty-first century skills. *Education and Information Technologies*, *26*(1), 35–48. https://doi.org/10.1007/s10639-020-10340-y

Shidiq, A. A. P., Rozi, F., & Purnama, Y. (2022). Professional Competency Analysis of Physical Education Teachers at The Level of Private Madrasah Ibtidaiyah Based on Government Regulation Number 19 of 2017. *Al-Aulad: Journal of Islamic Primary Education*, *5*(2), 103–112. https://doi.org/10.15575/al-aulad.v5i2.20001

Som, S., Roy, A., Pandit, A., Das, B. K., Saha, A., & Das, A. K. (2020). Assessing trainees' experience from the skill development programmes on inland fisheries management and its impact on human capital. *Journal of the Inland Fisheries Society of India*, *52*(1), 083. https://doi.org/10.47780/jifsi.52.1.2020.106548

Soultati, E. (2023). Comparison of Pedagogy and Andragogy teaching methods. *International Journal for Innovation Education and Research*, *11*(10), 22–27. https://doi.org/10.31686/ijier.vol11.iss10.4175

Tannehill, D., Demirhan, G., Čaplová, P., & Avsar, Z. (2021). Continuing professional development for physical education teachers in Europe. *European Physical Education Review*, *27*(1), 150–167. https://doi.org/10.1177/1356336X20931531

Tsangaridou, N. (2005). Classroom teachers' reflections on teaching physical education. In *Journal of Teaching in Physical Education* (Vol. 24, Issue 1). https://doi.org/10.1123/jtpe.24.1.24

Tsangaridou, N. (2012). Educating primary teachers to teach physical education. *European Physical Education Review*, *18*(3), 275–286. https://doi.org/10.1177/1356336X12450788

Wahyuni, S., Fitriati, S. W., Syafri, F., & ... (2021). Peningkatan Kompetensi Pedagogi Guru Melalui Pelatihan Aplikasi Pembelajaran Quizizz. *Seminar Nasional …*.

Wang, C., Omar Dev, R. D., Soh, K. G., Mohd Nasirudddin, N. J., Yuan, Y., & Ji, X. (2023). Blended learning in physical education: A systematic review. *Frontiers in Public Health*, *11*. https://doi.org/10.3389/fpubh.2023.1073423

Weeldenburg, G., Slingerland, M., Borghouts, L. B., Kromkamp, L., van Dijk, B., van der Born, E., & Vos, S. (2024). Evaluation of the digital teacher professional development TARGET-tool for optimizing the motivational climate in secondary school physical education. *Educational Technology Research and Development*, *72*(4), 2325–2348. https://doi.org/10.1007/s11423-024-10379-5