

## PERFORMANCE-BASED ASSESSMENT FOR LEARNING IN MIDDLE SCHOOLS: PHYSICAL EDUCATION, SPORTS AND HEALTH

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### Article Info

#### *Article history:*

*Received July 25, 2024*

*Revised September 21, 2024*

*Accepted September 25, 2024*

#### *Keywords:*

*Evaluation;*

*Learning Assessment;*

*Physical Education;*

*PJOK Teacher;*

*Public Middle Schools.*

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### ABSTRACT

This study aims to evaluate the implementation of physical education, sports, and health education in public middle schools. This type of research is called qualitative research. The evaluation was conducted involving 20 PJOK teachers spread across various public middle schools in Makassar City. We used observation and in-depth interviews as data collection techniques. Observations were conducted to directly observe the learning process in the classroom, while interviews were conducted to explore information related to experiences, obstacles, and teachers' views on the implementation of PJOK learning. The collected data were analyzed using qualitative analysis techniques with the steps of data reduction, data presentation, and drawing conclusions/verification. The results of the study showed that, although most teachers had implemented PJOK learning well, several major obstacles were found, namely limited sports facilities and limited time for practicum implementation. Based on these findings, the study recommends the need to improve PJOK teacher training, improve sports facilities and infrastructure, and add time for practicum learning in order to improve the quality of PJOK learning in public middle schools in Makassar City.

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## 1. INTRODUCTION

Physical education, sports, and health play a significant role in the physical, mental, and social development of students (Syafuruddin et al., 2022; Andryawan et al., 2024). This education aims to improve physical abilities, fitness, and health through structured physical activities while forming students' character, which includes discipline, cooperation, and responsibility. Sport is a physical activity used to train the human body to be physically and mentally healthy (Sufitriyono et al., 2023). In the context of education in Indonesia, PJOK is a compulsory subject taught at the junior high school level. However, although the existence of PJOK is very important, the implementation of learning in many junior high schools, including in big City, still faces various challenges.

Physical education is part of education that focuses on physical development through organized physical activities (Westerbeek & Eime, 2021; Siedentop & Van der Mars, 2022). This activity aims to improve students' physical fitness, motor skills, and character building. Physical education, as a field involving physical activity, provides students with the opportunity to learn through direct experience, which can increase their engagement and motivation to learn (Leo et al., 2022; Irvan et al., 2024). In the context of physical education, sports have a role in teaching motor skills and certain physical abilities, while health education emphasizes the importance of a healthy lifestyle that includes proper diet, hygiene, and disease prevention. According to Law of the Republic of Indonesia No. 20 of 2003 concerning the National Education System, education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential (Wartoyo, 2022). In this case, physical education plays a role in developing the physical and mental aspects of students, which ultimately contributes to the formation of a healthy and productive generation (Pangrazi & Beighle, 2019; Baena-Morales et al., 2021; Setiawati et al., 2024).

Public middle school is a crucial level of education in character building and basic skills for students (Cao et al., 2023). Currently, children are in a phase of rapid physical and psychological development, so they need learning that is not only focused on academics but also on aspects of physical fitness, motor skills, and health. Therefore, PJOK in public middle school aims to provide students with healthy living provisions that they can practice throughout their lives (Hafizh, 2021; Yudiasthira et al., 2023). Physical activities taught in PJOK also help reduce stress, increase learning concentration, and foster self-confidence. However, although the implementation of PJOK learning has become part of the curriculum, many schools face serious challenges in implementing this learning optimally (Erwin et al., 2020; Zheng et al., 2021). One of the main obstacles that is often encountered is the limited availability of adequate sports facilities. Most public middle schools in Makassar City still have limited sports facilities, and some schools do not even have complete sports fields or equipment to support maximum learning. This certainly affects the quality of PJOK learning received by students.

In addition, human resource factors, especially the competence of physical education teachers, also play a significant role in the success of this learning (Demchenko et al., 2021; Mitchell & Walton-Fisette, 2022). Physical education teachers are not only required to have a deep understanding of sports and health theory but must also be able to teach practical skills related to sports, as well as motivate students to live a healthy lifestyle (Stolz & Pill, 2014; Behzadnia et al., 2018). However, physical education teacher competency training and development often do not receive sufficient attention. This results in a lack of skills in managing classes and teaching appropriate sports skills. In addition, with an increasingly dense curriculum and limited time given for physical education, teachers often find it difficult to develop intriguing and effective methods for students (Sørensen & Lagestad, 2024; Muzakki et al., 2024).

At the junior high school level, the time allocated for PJOK subjects is often considered insufficient to discuss all aspects of this learning, both theory and practice. In the national curriculum, PJOK learning does not always get top priority, and limited class hours often make learning more focused on theoretical aspects than practice (Alif & Sudirjo, 2019; Nugroho et al., 2021). This limited time also reduces students' opportunities to practice directly and improve their physical skills. These limitations need to be considered so that PJOK learning can run effectively and have a positive impact on students.

Evaluation of PJOK learning is essential to determine the extent to which it is running according to the expected goals (Abdillah et al., 2019; Pratama et al., 2021). This evaluation is carried out to obtain information about the effectiveness of the methods used by teachers, the quality of the facilities available, and the obstacles faced by teachers and schools in carrying out PJOK learning. Objective assessments will provide a clearer picture of the challenges that exist and the steps for improvement that can be taken to improve the quality of PJOK learning (Lund & Kirk, 2019; Reichert et al., 2020). In Makassar City, evaluation of PJOK learning in junior high schools is still very rare. Therefore, this study aims to provide a deeper picture of the condition of PJOK learning in junior high schools in Makassar City, with a focus on identifying problems and challenges faced by teachers and students. This study also focuses on analyzing the influence of factors such as sports facilities, learning time, and teacher competence on the success of PJOK learning.

The main objective of this study is to evaluate the implementation of PJOK learning in junior high schools in Makassar City, identify obstacles faced by teachers, and provide recommendations for improvement. This study is expected to provide useful information for schools, local governments, and education offices in developing policies that can support improving the quality of PJOK learning. With this evaluation, it is expected that the implementation of PJOK learning in junior high schools in Makassar City can run more effectively so that students can get maximum benefits from physical education, sports, and health. By conducting a comprehensive evaluation of PJOK learning, it is hoped that better education can be created that supports the formation of a healthy, active young generation that is ready to face challenges in the future.

## **2. METHOD**

This research design uses a qualitative approach with a descriptive method. This approach was chosen because it aims to evaluate in depth the implementation of physical education, sports, and health education in public middle schools in Makassar City through an understanding of the realities experienced by teachers as the main actors in learning. A qualitative approach is used to understand the phenomenon of PJOK learning from the teacher's perspective and real conditions in the field. This study focuses on the interaction between teachers and students during the learning process, the obstacles faced in implementing it, and the efforts made by teachers to overcome these challenges. This approach allows researchers to dig up information in depth

through direct interaction with research subjects. The research subjects were 20 PJOK teachers from public middle schools in Makassar City who were selected using a purposive sampling technique. This selection was carried out to ensure that the teachers who became participants were those who actively teach PJOK at the public middle schools' level, have sufficient teaching experience to provide relevant and valid information, and are willing to participate in the research. The number of samples of 20 (twenty) people is considered sufficient to provide a diversity of views and adequate representation of the conditions of PJOK learning in public middle schools in Makassar City.

Research instruments are tools used to collect data systematically and in accordance with research objectives. In this study, the instruments used include observation guidelines and interview guidelines designed to evaluate the implementation of physical education, sports, and health learning in public middle schools in Makassar City.

The observation instrument is designed to directly observe PJOK learning activities carried out by teachers in the classroom and in the field. This guideline includes several indicators, such as the learning methods used, student involvement in activities, use of learning media, and the availability of sports facilities and infrastructure. Observations are carried out systematically to obtain factual data regarding the real conditions of PJOK learning. This instrument helps researchers identify gaps between learning plans and implementation in the field. Interview guidelines are used to dig deeper into information regarding the experiences, views, and obstacles faced by PJOK teachers. These guidelines are compiled based on several main topics, such as teachers' understanding of the PJOK curriculum, implementation of learning, evaluation of student learning outcomes, and challenges faced during the learning process. Semi-structured interviews were chosen so that researchers could explore various aspects that emerged during the discussion. The interview instrument was designed to produce relevant and in-depth data related to teacher practices and perceptions.

The data analysis technique in this study uses three main steps: data reduction, data presentation, and drawing conclusions/verification. Here is a simple explanation of each step: Data reduction is the process of simplifying and selecting the most relevant data from observations and interviews. From interviews with PJOK teachers, researchers only took information about learning methods, obstacles faced, and suggestions for improvement. Irrelevant data, such as off-topic conversations, were ignored. The goal is to make the data more focused and simpler to analyze. Data presentation is done by displaying summarized data in a structured and easy-to-understand form. Data on learning obstacles is presented in narrative form, tables, or diagrams to make it easier to read. This presentation helps researchers see patterns and relationships between findings, such as the relationship between limited facilities and learning quality. The final step is to conclude the findings from the data that has been presented. Researchers look for main patterns or themes, such as the most widely used learning methods or the main obstacles faced by teachers. Temporary conclusions are verified by comparing data from observations and interviews (triangulation) to ensure the results are accurate.

### 3. RESULTS AND DISCUSSION

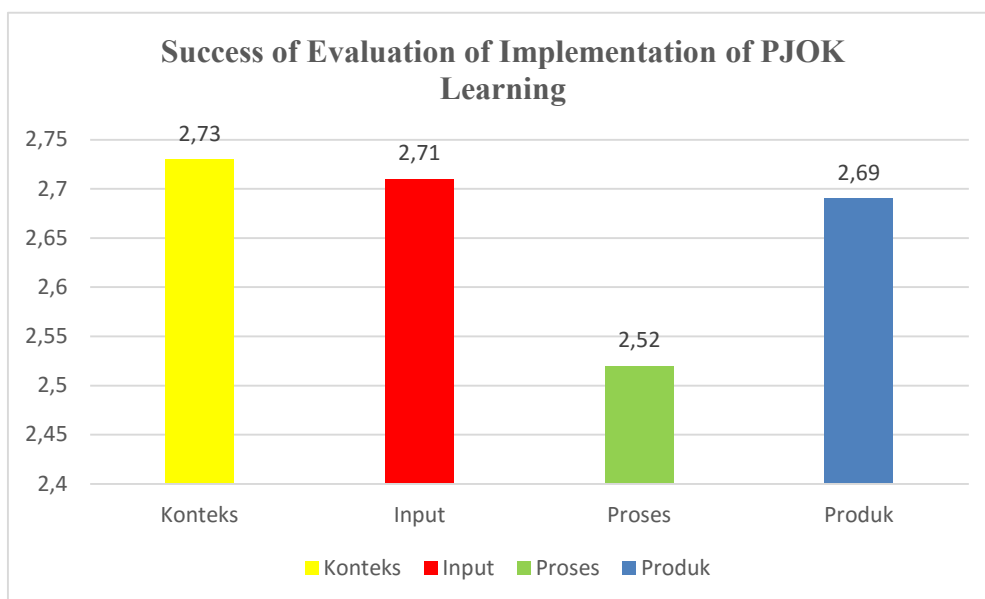
#### Results

The CIPP (Context, Input, Process, Product) evaluation model was used to look at the results of Physical Education, Sports, and Health learning in public middle schools in Makassar City. The results were pretty good. The following are the results of the evaluation aspect's data analysis in Table 1.

**Table 1.** CIPP Evaluation Results

No	Evaluation Aspect	Score	Criteria
1	Context	2,73	Good
2	Input	2,71	Good
3	Process	2,52	Good
4	Product	2,69	Good
	CIPP Evaluation	2,66	Good

When presented in the form of a line diagram, the Context, Input, Process, Product (CIPP) evaluation evaluates the implementation of physical education in public middle school Makassar. The following graph is presented in Figure 1 as follows.



**Figure 1.** CIPP Evaluation Graph

Figure 1 above shows that the evaluation of the implementation of physical education, sports, and health learning in public middle schools throughout Makassar City is 2.66 in the "good" category. The evaluation based on each component can be explained as follows.

1. Contextual evaluation of the implementation of physical education, sports, and health education in public junior high schools in Makassar City: 2.73 in the excellent category.

2. The input evaluation of the implementation of physical education, sports, and health learning in public middle schools in Makassar City is 2.71 in the excellent category.
3. The process evaluation of the implementation of physical education, sports, and health learning in public middle schools in Makassar City is 2.52 in the excellent category.
4. The product evaluation of the implementation of physical education, sports, and health learning in public middle schools in Makassar City is 2.69 in the excellent category.

## Discussion

**The context aspect** relates to understanding the goals and needs of physical education, sports, and health learning and the policies underlying the program (García-Rico et al., 2021). A score of 2.73 indicates that the implementation of physical education, sports, and health learning in public middle schools in Makassar City is in accordance with the educational context and student needs, although there is still room for development.

**Relevance to Student Needs:** Physical education, sports, and health learning in public middle schools in Makassar tend to be relevant to students' needs to improve physical fitness, motor skills, and knowledge of healthy lifestyles. However, relevance to the latest developments in sports and health science, such as the introduction of modern sports or technology-based fitness, can be a consideration for program improvement.

**Influence of Education Policy:** Education policies that support sports activities in schools are quite good, but there should be increased support in terms of budget and facilities. The success of physical education, sports, and health learning is highly dependent on policies that emphasize the importance of physical education as an integral part of the curriculum (Mitchell & Walton-Fisette, 2022). Policies that support value-based learning, such as sportsmanship and teamwork, can enrich students' learning experiences.

**Stakeholder Involvement:** Schools and parents need to be more involved in supporting sports activities outside of school hours, both in terms of time, facilities, and motivation. Therefore, stakeholder involvement in formulating physical education, sports, and health objectives and policies will have a more positive impact on the success of this program.

**The input aspect** measures the quality and quantity of resources used in physical education, sports, and health learning, such as teacher qualifications, facilities, and infrastructure, as well as the teaching materials used (Zhang & Zhang, 2023).

**Teacher Competence:** A score of 2.71 indicates that physical education, sports, and health teachers in public middle schools in Makassar City have adequate competence, but ongoing training is still needed so that they can adapt more innovative learning approaches. For example, the development of more diverse learning methods, such as using technology in teaching sports, needs to be introduced. In addition, teachers' abilities in handling students with various levels of physical skills must also be continuously honed.

**Sports Facilities:** Although the score on the input aspect shows excellent conditions, the limited availability of adequate sports facilities in several schools is still a problem. Several schools in Makassar City have limited facilities, such as small fields or incomplete sports equipment. This certainly affects the effectiveness of practical activities that should be the focus of physical education, sports, and health learning.

**Other Supporting Resources:** Provision of intriguing teaching materials and learning media that are in accordance with contemporary sports developments can increase the effectiveness of learning. In addition, the use of classrooms for theoretical learning about health and nutrition is very important, but many schools have not utilized digital or application-based learning media to support more interactive and intriguing PJOK learning.

***The process aspect*** measures how the implementation of physical education, sports, and health learning activities is carried out, including interactions between teachers and students, the methods applied, and student activity in participating in learning (Ho et al., 2021).

**Learning Method:** Although a score of 2.52 is in the excellent category, this score indicates that there is room to improve the quality of the learning process. The use of monotonous learning methods can reduce student engagement, so it is important to apply more active and varied methods. For example, the use of a game-based learning approach or project-based learning that involves students in planning and implementing sports activities can increase student engagement.

**Student Activity:** One of the factors that influences the low score in the process aspect is the lack of active participation from students in learning activities. Some students may feel less interested in certain sports or less confident in participating. For this reason, a more personal approach and providing opportunities for students to choose the type of sport they are interested in can increase their involvement. The application of a differentiation approach that adjusts to students' skill levels is also important.

**Learning Time:** Limited time in carrying out sports activities and practicums is a major obstacle in implementing the learning process. In some schools, the time allocated for physical education, sports, and health is often not enough to carry out effective physical activities. Therefore, evaluating the division of lesson time and time allocation for practicums can help improve the quality of the physical education, sports, and health learning process (Lamb & King, 2021).

***The product aspect*** measures the final results of physical education, sports, and health learning, such as increased physical skills, understanding of health, and changes in students' attitudes towards sports and healthy lifestyles (Arufe-Giráldez et al., 2023; Sepriani et al., 2024).

**Improvement of Student Skills:** A score of 2.69 indicates that the results of physical education, sports, and health learning are quite good, with students experiencing improvements in physical skills, such as gross and fine motor skills. However, this achievement can still be more optimal by introducing more varied and challenging sports and providing constructive feedback for each student, especially in terms of improving technique.



Changes in Attitude and Knowledge: Physical education, sports, and health learning also aim to shape students' attitudes toward the importance of healthy living, such as good eating patterns and exercise habits. With a favorable score on the product aspect, it can be concluded that students are beginning to understand the importance of maintaining health and exercising regularly. However, character building, such as sportsmanship, teamwork, and perseverance in exercising, needs to be prioritized in the evaluation of learning outcomes.

Evaluation Based on Competency Standards: To improve learning products, evaluation based on clear competency standards needs to be implemented. This helps to focus more on achieving the learning objectives that have been set at the beginning. More diverse assessments, such as portfolio assessments or competency-based assessments, can better reflect students' holistic development ([Oudkerk Pool et al., 2020](#); [Lim, 2024](#)).

Overall, the CIPP evaluation score of 2.66 places the implementation of physical education, sports, and health learning in public middle schools in Makassar City in the excellent category. However, there is still room to improve the quality of learning, especially in the process aspect and strengthening facilities.

#### 4. CONCLUSION

Most teachers in Makassar City's public middle schools have successfully implemented physical education, sports, and health learning. Many teachers have implemented active learning methods that are oriented towards developing students' physical skills and character. However, several obstacles are still faced, including limited adequate sports facilities and limited time to conduct practicums. This causes the implementation of learning to not be fully optimal, especially in terms of developing students' motor skills. In addition, the results of interviews with teachers showed that although most teachers have a high commitment to implementing learning, the lack of special training to improve competence in teaching physical education, sports, and health is one of the obstacles. Lack of access to relevant training or workshops for developing teaching methodology also affects the quality of learning provided.

A suggestion and recommendation that can be given is the need to improve sports facilities in every junior high school in Makassar City to support more optimal practicum activities. In addition, the local government needs to pay attention to the need for ongoing training for physical education, sports, and health teachers so that they can develop more innovative and effective learning methods. Thus, the quality of physical education, sports, and health learning can be improved, and students can obtain more optimal benefits from the physical education and sports provided.

#### REFERENCES

- Abdillah, R., Sulaiman, S., & Rumini, R. (2019). Program Evaluation Work Group Teacher Physical Education Sports and Health Primary Schools in Alian District Kebumen



- Regency. *Journal of Physical Education and Sports*, 8(6), 204-208.
- Alif, M. N., & Sudirjo, E. (2019). *Filsafat pendidikan jasmani*. Muhammad Nur Alif.
- Andryawan., Suwardi., Irvan., Hudain, M. A., & Nurussyariah. (2024). Pre-Service Teacher of PJOK: The Effect of Box Skip Training on Leg Muscle Power. *ETDC: Indonesian Journal of Research and Educational Review*, 3(3), 128-138.
- Arufe-Giráldez, V., Sanmiguel-Rodríguez, A., Ramos-Álvarez, O., & Navarro-Patón, R. (2023). News of the pedagogical models in physical education—A quick review. *International Journal of Environmental Research and Public Health*, 20(3), 2586.
- Baena-Morales, S., Jerez-Mayorga, D., Delgado-Floody, P., & Martínez-Martínez, J. (2021). Sustainable development goals and physical education. A proposal for practice-based models. *International Journal of Environmental Research and Public Health*, 18(4), 2129.
- Behzadnia, B., Adachi, P. J., Deci, E. L., & Mohammadzadeh, H. (2018). Associations between students' perceptions of physical education teachers' interpersonal styles and students' wellness, knowledge, performance, and intentions to persist at physical activity: A self-determination theory approach. *Psychology of Sport and Exercise*, 39, 10-19.
- Cao, X., Ji, S., & Liu, X. (2023). Educational inequity and skill formation differences experienced by floating rural students in the process of urbanization: a case study from a school perspective. *Education Sciences*, 13(2), 131.
- Demchenko, I., Maksymchuk, B., Bilan, V., Maksymchuk, I., & Kalynovska, I. (2021). Training future physical education teachers for professional activities under the conditions of inclusive education. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(3), 191-213.
- Erwin, H., Brusseau, T. A., Darst, P. W., & Pangrazi, R. P. (2020). *Dynamic physical education for secondary school students*. Human Kinetics Publishers.
- García-Rico, L., Martínez-Muñoz, L. F., Santos-Pastor, M. L., & Chiva-Bartoll, O. (2021). Service-learning in physical education teacher education: A pedagogical model towards sustainable development goals. *International Journal of Sustainability in Higher Education*, 22(4), 747-765.
- Hafizh, M. (2021). Profesionalisme Guru Penjaskes Dalam Meningkatkan Motivasi Belajar Di SMP Negeri 3 Batusangkar. *El-Rusyd*, 6(2), 17-32.
- Ho, W. K. Y., Ahmed, M. D., & Kukurova, K. (2021). Development and validation of an instrument to assess quality physical education. *Cogent Education*, 8(1), 1864082.
- Irvan., Syafruddin, M. A., & Sufitriyono. (2024). The Impact of Highest Rally Training on Improving Drive Shot Ability in Squash Games. *ETDC: Indonesian Journal of Research and Educational Review*, 3(2), 165-171.
- Lamb, P., & King, G. (2021). Developing the practice of pre-service physical education teachers through a dyad model of lesson study. *European Physical Education Review*, 27(4), 944-960.
- Leo, F. M., Mouratidis, A., Pulido, J. J., López-Gajardo, M. A., & Sánchez-Oliva, D. (2022). Perceived teachers' behavior and students' engagement in physical education: The mediating role of basic psychological needs and self-determined motivation. *Physical Education and Sport Pedagogy*, 27(1), 59-76.
- Lim, K. (2024). Assessing beyond grades: unravelling the implications on student learning and engagement in higher education. *Assessment & Evaluation in Higher Education*, 1-15.
- Lund, J. L., & Kirk, M. F. (2019). *Performance-based assessment for middle and high school physical education*. Human Kinetics Publishers.
- Mitchell, S. A., & Walton-Fisette, J. L. (2022). *The essentials of teaching physical*

- education: Curriculum, instruction, and assessment.* Human Kinetics.
- Muzakki, A., Kobandaha, F., Annas, A. N., & Arifin, B. (2024). Tantangan dan peluang integrasi pendidikan jasmani dalam kurikulum pendidikan dasar: Sebuah tinjauan literatur. *Innovative: Journal Of Social Science Research*, 4(5), 8511-8521.
- Nugroho, U., Kor, S. P., & Or, M. (2021). *Mari Memahami Pembelajaran Gerak Pendidikan Jasmani*. Penerbit CV. SARNU UNTUNG.
- Pangrazi, R. P., & Beighle, A. (2019). *Dynamic physical education for elementary school children*. Human Kinetics Publishers.
- Pratama, A. C., Soegiyanto, S., & Priyono, B. (2021). Evaluation of Physical Education Online Learning Based on Technological Pedagogical Content Knowledge for Students of Junior High School 1 Gondang Jawa Timur. *Journal of Physical Education and Sports*, 10(4), 394-400.
- Oudkerk Pool, A., Jaarsma, A. D. C., Driessen, E. W., & Govaerts, M. J. (2020). Student perspectives on competency-based portfolios: Does a portfolio reflect their competence development?. *Perspectives on medical education*, 9, 166-172.
- Reichert, M., Giurgiu, M., Koch, E. D., Wieland, L. M., Lautenbach, S., Neubauer, A. B., ... & Liao, Y. (2020). Ambulatory assessment for physical activity research: state of the science, best practices and future directions. *Psychology of sport and exercise*, 50, 101742.
- Sepriani, R., Ockta, Y., Eldawaty, E., & Padli, P. (2024). How do physical fitness, nutritional status, and self-concept affect student learning outcomes in physical education with a focus on health and hygiene education?. *Jurnal Konseling Dan Pendidikan*, 12(3), 1-11.
- Setiawati, R., Frimananda, G. R., Hasanah, U., Dian, A. D. S., Fitriyati, N., & Mulyana, A. (2024). Membangun Keterampilan Sosial: Peran Olahraga Jasmani dalam Perkembangan Sosial Anak Sekolah Dasar. *Indo-MathEdu Intellectuals Journal*, 5(3), 2728-2740.
- Siedentop, D., & Van der Mars, H. (2022). *Introduction to physical education, fitness, and sport*. Human kinetics.
- Stolz, S., & Pill, S. (2014). Teaching games and sport for understanding: Exploring and reconsidering its relevance in physical education. *European Physical Education Review*, 20(1), 36-71.
- Sufitriyono, S., Irvan, I., Syafruddin, M. A., Sutriawan, A., & Jahrir, A. S. (2023). Bottom Passing of Students at SMA Negeri 1 Binamu. *Musamus Journal of Physical Education and Sport (MJPEs)*, 6(1), 35-40.
- Syafruddin, M. A., Jahrir, A. S., & Yusuf, A. (2022). Peran Pendidikan Jasmani Dan Olahraga Dalam Pembentukan Karakter Bangsa. *Jurnal Ilmiah STOK Bina Guna Medan*, 10(2), 73-83.
- Sørensen, A., & Lagestad, P. (2024). Physical education students' reflections about the learning outcomes of different teaching methods: a mixed methods study. In *Frontiers in Education* (Vol. 9, p. 1365916). Frontiers Media SA.
- Wartoyo, F. X. (2022). Menakar korelatifitas merdeka belajar dengan sistem pendidikan nasional undang-undang nomor 20 tahun 2003 dan pancasila. *Widya Pranata Hukum: Jurnal Kajian Dan Penelitian Hukum*, 4(2), 140-153.
- Westerbeek, H., & Eime, R. (2021). The physical activity and sport participation framework—a policy model toward being physically active across the lifespan. *Frontiers in sports and active living*, 3, 608593.
- Yudisthira, A., Damrah, D., Ihsan, N., Yenes, R., & Khairroh, J. (2023). Evaluation of Mastery of Pedagogic Competence of Physical Education, Sports and Health (PJOK). *Kinestetik: Jurnal Ilmiah Pendidikan Jasmani*, 7(4), 940-951.

- Zheng, W., Ma, Y. Y., & Lin, H. L. (2021). Research on blended learning in physical education during the COVID-19 pandemic: A case study of Chinese students. *Sage Open*, 11(4), 21582440211058196.
- Zhang, J., & Zhang, C. (2023). Teaching quality monitoring and evaluation of physical education teaching in ordinary college based on edge computing optimization model. *The Journal of Supercomputing*, 79(15), 16559-16579.