

**ANALYSIS OF THE LEVEL OF UNDERSTANDING OF THE 2025 PENCAK SILAT
COMPETITION REGULATIONS OF KABUPATEN BUNGO PENCAK SILAT
REFEREES AND JUDGES**

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Abstract

The National Pencak Silat Competition Regulations (PPPSN 2025) require referees and judges to adjust their understanding of competition rules, arts category (TGR), violations, and decision-making authority. These regulatory changes have the potential to lead to differing interpretations, particularly among referees and judges who are still accustomed to the previous regulations. Therefore, mastery of the 2025 PPPSN is a crucial component of referee and judges competency, ensuring the proper, uniform, and consistent application of the rules in competitions. This study aims to assess the level of understanding of Pencak Silat referees and judges in Kabupaten Bungo regarding the Pencak Silat Competition Regulations (PPPSN 2025). The study used a quantitative descriptive approach with a survey method. The research sample consisted of 13 active referees and judges in Kabupaten Bungo, determined through a total sampling technique. The research instrument was a 30-item objective test that had been validated and covered three main aspects: the match category, the arts category (TGR), and violations and the authority of the referee-judges. Data were analyzed using descriptive percentage statistics. The results showed that the average level of understanding of respondents was in the Very Good category with an achievement of 84.60%. Specifically, understanding in the match category reached 86.90%, the arts category (TGR) 80.80%, and the authority of the referee-judges 93.80%. These findings indicate that the majority of referees and judges have a good understanding of the substance of the PPPSN 2025, although there were still variations in understanding, especially in the aspects of the arts category (TGR) and the details of certain violations. Factors suspected of influencing this situation include the limited availability of refresher courses specifically addressing changes from previous regulations to the PPPSN 2025 and the influence of the habitual use of the old rules. The study concluded that the competence of referees and judges in understanding the regulations in Kabupaten Bungo is already at a good level to support match implementation. However, regular socialization, refresher courses, and match simulations based on the PPPSN 2025 are needed to ensure uniform, adaptive, and consistent interpretation of the rules in the field, thereby maintaining sportsmanship and match integrity.

Keywords: Understanding, Referee, Judges, Pencak Silat, Match Rules

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INTRODUCTION

Pencak silat is a traditional martial art originating from the Indonesian archipelago and developed throughout Southeast Asia, particularly in Indonesia, Malaysia, Brunei, and parts of the southern Philippines (Darmawan et al., 2023) ; (Kartomi, 2011). Pencak Silat is a national cultural heritage that encompasses not only martial arts but also philosophical, moral, and character-building values (Ilham et al., 2023) ; (Darmawan et al., 2023). Pencak Silat is a beautiful movement of steps

with dodging, which includes movements with elements of comedy, Pencak Silat can be shown as a means of entertainment, while silat is an element of self-defense techniques for parrying, attacking and locking which cannot be demonstrated in public (Candra, 2021). The pencak silat tradition recognizes the values of good character, self-control, respect for opponents, and sportsmanship as integral parts of training and competition (Pradana et al., 2025). Pencak silat has developed into a competitive sport recognized nationally and internationally (Prawibowo et al., 2026) ; (Ihsan et al., 2026). From a competitive perspective, fairness is a key requirement for meaningful competition. Fairness depends not only on the athlete's ability but also on the consistent application of the rules by the referee and judges. Therefore, a proper understanding of match regulations forms the ethical foundation for referees (Syahputra, 2021). Referees and judges are not merely enforcers of the rules, but also represent the values of honesty, objectivity, and moral responsibility in pencak silat matches (Sad et al., 2023).

Rules in sports often undergo changes or updates based on various factors such as technological developments, changes in safety requirements, or efforts to make the game fairer (Syafitri et al., 2025); (Wright, 2013). Pencak silat competitions have their own rules, and athletes, coaches, and match officials must follow the applicable competition rules. Mastering the understanding of the rules in pencak silat is the most important aspect of a competition (Lestari & Sutapa, 2020). The success of a pencak silat match depends heavily on the quality of leadership and fair judgment from the referee and judges (Natalia & Wahyudi, 2022). The competence of referees and judges includes not only a deep understanding of the competition rules, but also the ability to observe, analyze, and make decisions quickly and accurately under intervention (Prawibowo et al., 2026). Decision-making is a fundamental skill for match officials because their decisions can directly affect the flow and fairness of the match (Kittel et al., 2025). Specifically, (Hoelbling et al., 2023) showed that refereeing responsibilities in combat sports are closely related to decision-making to enforce the rules, which requires experience, perception, categorization, memory processing, and information integration. These findings are relevant to pencak silat because referee and judges decisions must be made based on interpretations of fast-paced and complex match events. Therefore, it is important to examine the changes to the regulations for the 2025 national pencak silat competition from the perspective of referees and judges, as mastery of the new regulations is an important prerequisite for creating appropriate, consistent, objective, and fair match decisions.

Kabupaten Bungo is one of the regions actively involved in the development and organization of pencak silat activities in Provinsi Jambi. Ongoing competition activities require competent match officials who are adaptive to regulatory changes (Utami et al., 2025). Through involvement related to aspects of understanding the established rules, referees and judges can determine the scores that occur in match events (Abdillah et al., 2024) ; (Russell et al., 2020). However, in practice, assessments often arise from differing perspectives between the two parties, namely the referee and the coach concerned. However, it can currently be identified that within the concept of a pencak silat martial arts

competition, a number of injury cases can still be identified, often captured by the categorization of competitions in that realm (Wahyuningtyas et al., 2024). A number of athletes experience injuries during competitions, which are closely related to the use of certain rules applied in pencak silat competitions, which can be compared with the rules of the competition that were implemented at the time (Abdillah et al., 2024) ; (Suryaningrum & Shapie, 2025). Empirically, every regulatory change is almost always followed by a transition period of understanding in the field. Referees and judges who have long used the previous version of the rules often carry over their old interpretations when faced with new provisions. This can lead to differences in interpretation, particularly in aspects that have undergone substantial changes, such as the rules for falls, certain violation categories, sanctions, and the judging criteria for the artistic category. Regulatory changes to the National Pencak Silat Competition Regulations (PPPSN 2025) essentially aim to strengthen the legal certainty of competitions, improve athlete safety, clarify violation categories, and refine the scoring system for both the competitive and artistic categories (singles, doubles, and teams) (IPSI, 2025). Ideally, all referees and judges working at various levels of competition should have a unified perception and interpretation of the rules. Uniformity of interpretation is crucial for reducing disparities in decisions between matches, minimizing disputes over results, and increasing athlete, coach, and public confidence in the organization of competitions. Within the framework of developing high-performance sports, the quality of match referees is an integral part of the competition quality system, equal in importance to the quality of athletes, coaches, and organizers.

Evaluating the competency of pencak silat referees and judges is crucial to ensuring high standards in every match. Competency evaluation studies aim to identify areas of strength and weakness for referees and judges, so that appropriate training and development programs can be designed to improve their quality (Prawibowo et al., 2026) ; (Mascarenhas et al., 2005). Therefore, evaluating the level of understanding of referees and judges becomes an urgent practical need following the implementation of the PPPSN 2025. Research on the competency of pencak silat referees and judges generally focuses on aspects of performance, experience, or training, while specific studies on understanding the new regulations following the regulatory changes remain relatively limited, particularly at the regional level. Thus, there is a research gap in evaluating understanding of the regulations following the revised competition rules within the Kabupaten Bungo IPSI Regional Executive Board. The urgency of this research lies in the need to provide objective data on the level of mastery of the PPPSN 2025 by active referees and judges. This data is crucial as a basis for developing refresher courses, rule interpretation workshops, match simulations, and ongoing certification programs. Furthermore, the research findings can serve as organizational evaluation material to ensure that all field referees have a uniform standard of understanding before officiating in official matches.

Based on the philosophical, idealistic, and empirical descriptions above, the research problem is formulated as follows: What is the level of understanding of the Pencak Silat Competition Regulations (PPPSN 2025) among Kabupaten Bungo referees and judges? This study aims to analyze the level of understanding of the PPPSN 2025 among Kabupaten Bungo referees and judges regarding the aspects of match categories, artistic categories, violations, and referee-judges authority. Practically, this research is expected to provide benefits to the Kabupaten Bungo IPSI (Indonesian Martial Arts Association) as a basis for developing competency improvement programs, to referees and judges as material for professional reflection, and to the development of sports science, particularly in the field of officiating pencak silat matches.

METHODS

Research design

This study uses a quantitative approach with a descriptive design through a survey method. The study aims to describe the level of understanding of pencak silat referees and judges regarding the National Pencak Silat Competition Regulations (PPPSN 2025) without providing treatment or intervention. Understanding is defined as the respondent's ability to recognize, interpret, and determine the appropriate regulatory provisions in a match situation. Measurement includes three indicators, namely (1) match category, (2) arts category (TGR), and (3) violations and referee-judge authority.

Research participants

The study was conducted on active referees and judges at the Kabupaten Bungo IPSI Regional Executive Board. The sample was determined using total sampling, meaning all members of the population who met the research criteria were included as respondents. A total of 13 active referees and judges participated in the study. All respondents participated voluntarily after receiving information regarding the study's objectives, procedures, data confidentiality, and use for academic purposes.

Data collection instrument

Data were collected using a 30-item objective test structured based on the substance of the PPPSN 2025. The instrument included three indicators proportionally, each consisting of 10 items (33.33%), namely competition category, arts category (TGR), and violations and referee-judge authority. Each item had one correct answer and used dichotomous scoring, with 1 for correct answers and 0 for incorrect answers, resulting in a maximum score of 30. The instrument's content validity was assessed by three experts with competence and experience in the fields of pencak silat, refereeing, and instrument evaluation. The assessment included item alignment with the PPPSN 2025 indicators, clarity of formulation, and accuracy of the answer key. Instrument items were revised based on expert recommendations before being used in data collection. Instrument reliability was not calculated because dichotomous (0/1) response data per item were not yet available; therefore, KR-20 scores are

not reported in this study.

Data collection procedure

Data collection was conducted through several stages, including the development of test grids and items based on the PPPSN 2025, validation and revision of the instrument by experts, coordination with the Kabupaten Bungo IPSI Regional Executive Board, and the administration of the test to respondents. The test was administered individually within a specified timeframe without the use of reference sources. Upon completion, the answer sheets were collected and checked using the same answer key for all respondents.

Data analysis procedure

Data were analyzed using descriptive statistics in percentage form. Correct answers were scored 1 and incorrect answers were scored 0. The percentage level of understanding was calculated using the formula:

$$P = (F/N) \times 100\%$$

Where:

P = percentage level of understanding

F = score obtained

N = maximum score

Respondents' level of understanding is categorized based on the percentage score obtained. The very good category is set at 81-100%, good at 61-80%, fair at 41-60%, poor at 21-40%, and very poor at 0-20% (Purwanto, 2000). Analysis was carried out to describe the overall level of understanding of participants and based on each research indicator. Because this research uses a descriptive approach and involves referees and judges in Kabupaten Bungo.

RESULTS AND DISCUSSION

Results

Based on the distribution of data collected through the PPPSN 2025 comprehension test, the scores obtained are as follows.

Table 1. Research results

Score category	Range	Frequency	Percentage
Very good	81-100%	11	84,60%
Good	61-80%	2	15,40%
Fair	41-60%	0	0%
Poor	21-40%	0	0%
Very poor	0-20%	0	0%
Amount		13	100%

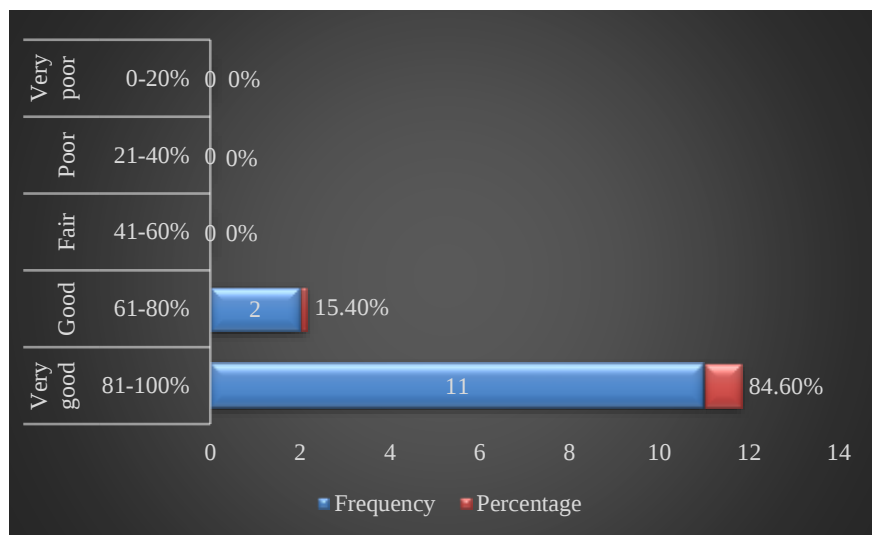


Figure 1. Information function test

The average overall comprehension score of referees and judges was 84.60%, which falls into the Very Good category. Eleven respondents were in the Very Good category, two respondents in the Good category, and no respondents were in the Fair or Poor category. These findings indicate that the majority of match referees in Kabupaten Bungo have mastered the basic substance of the PPPSN 2025. To examine the strengths and weaknesses of comprehension in more detail, an analysis was conducted per indicator as follows.

Table 2. Level of understanding of referees and judges in Kabupaten Bungo

Indicators	Achievement Percentage	Category
Match category	86,90%	Very good
Arts category (TGR)	80,80%	Very good
Violations and referee-judges authority	93,80%	Very good

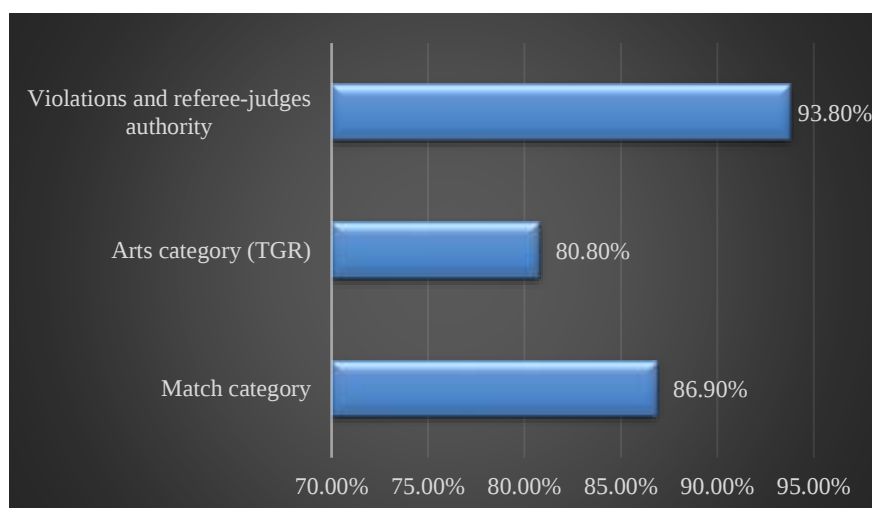


Figure 2. Test information function

The table above shows that the indicator with the highest achievement was violations and referee-judges authority (93.80%), followed by the competition category (86.90%), while the arts category (TGR) (80.80%) was the indicator with the lowest achievement, although still in the very good category. This pattern indicates variations in material mastery across regulatory areas that require attention in the ongoing development program.

Discussion

1. Understanding of the match category: adapting to technical changes in matches

The 86.90% achievement in the match category indicates that the majority of respondents understood the basic rules for scoring strikes, points, takedowns, and the rules for matchmaking in the PPPSN 2025. This result is important because the match category is the most frequently encountered competition by referees and judges in regional competitions. The high level of understanding in this indicator is likely influenced by the relatively greater frequency of experience in matchmaking compared to the arts category (TGR). Field experience allows match referees to interact directly with recurring decision-making situations, thus becoming more internalized in their interpretation of the rules (Hamzah et al., 2026). However, the less-than-optimal performance indicates that there is still room for improvement, particularly in aspects that have changed from the previous regulations, such as the provisions for takedowns and the interpretation of specific situations in scoring. In sports adjudication practice, changes to the wording of rules often seem simple but have significant interpretative consequences. Therefore, a refresher course emphasizing case studies and match decision simulations is essential to ensure that understanding does not stop at memorizing the articles but leads to consistent application in the field.

2. Understanding the arts category (TGR): areas most in need of strength

The arts category (TGR) indicator achieved 80.80%, the lowest of the three indicators. While still in the very good category, this position indicates that understanding of singles, doubles, and Team judging varies relatively among respondents. The arts category (TGR) does have different characteristics than the competition category. The referee not only assesses the correctness of an action, but also assesses the appropriateness of the form, stability of movement, synchronization, and timing according to applicable regulations. The complexity of these assessment dimensions demands a high level of consistency in interpretation. Furthermore, the frequency of arts category (TGR) matches at the regional level is generally lower than Competition, so opportunities for judging practice are also more limited. This finding aligns with respondents' recognition that the majority of their experience on the job has been in the Competition Category. Therefore, the need for competency improvement in the arts category (TGR) is not due to the general low quality of referees and judges, but rather to differences in the

intensity of experience and exposure to arts assessment material. Recommended training programs include video analysis workshops, mock judging, and arts category (TGR) assessment simulations using match recordings and live demonstrations.

3. Referee-judges authority: respondents' core competency strength

The highest score for the referee-judges authority indicator (93.80%) indicates that respondents have a very strong understanding of the division of authority, types of reprimands, warnings, disqualifications, and basic decision-making procedures according to the PPPSN 2025. Mastery of the authority aspect is a positive finding because errors in this area can lead to more serious procedural disputes than ordinary technical errors in judging. The high score also indicates that the material on authority and sanctions may be easier to understand because it is normative and explicit in the regulations. However, understanding of authority still needs to be tested through simulations of real-life match situations. Under high-pressure conditions, a referee's success is determined not only by declarative knowledge of the articles, but also by the ability to apply procedures quickly, decisively, and consistently.

4. The influence of old rules and limited refresher courses

This study found indications that some respondents were still influenced by the habit of using the previous version of the rules. The phenomenon of habit persistence is common in professions that have long used certain procedures. When new regulations are implemented, individuals tend to carry over their old interpretation schemes until they receive sufficient training and reinforcement on the new rules. Another contributing factor is the limited frequency of refresher courses specifically discussing the changes from the old rules to the PPPSN 2025. One-way socialization is often insufficient to build uniformity of interpretation. What is needed is case-based learning, discussions of differing interpretations, and joint evaluation of match decision examples. In the context of organizational development, the results of this study provide a positive signal: the majority of referees and judges are already in the very good category, allowing competency improvement programs to focus on fine-tuning rule interpretation and strengthening the arts category (TGR), rather than on mastering the basic rules.

5. Practical implications for the Pengcab IPSI Kabupaten Bungo

- a. Holding regular refresher courses. The material will focus on substantial changes to the PPPSN 2025, particularly the rules on falls, certain violations, and the judging criteria for the arts category (TGR).
- b. Video-based rules interpretation workshops. Participants will assess the same match recordings and then discuss differences in decisions to establish uniformity in interpretation.
- c. TGR match simulations. This activity is important because the arts category (TGR) is the indicator with the lowest achievement.
- d. Periodic competency evaluations. Regulatory understanding tests can be used as monitoring instruments before assignments in official championships.

- e. Developing a question bank and match case studies. The question bank will enable self-study and material updates when regulations change.

CONCLUSION

The level of understanding of Kabupaten Bungo Pencak Silat referees and judges regarding the 2025 National Pencak Silat Competition Regulations (PPPSN 2025) is generally in the very good category with an average achievement of 84.60%. Most respondents have understood the provisions in the competition category, the arts category (TGR), as well as violations and the authority of referees and judges in accordance with applicable regulations. In detail, the level of understanding in the competition category reached 86.90%, the arts category (TGR) 80.80%, and violations and the authority of referees-judges 93.80%, all of which are in the very good category. However, the arts category (TGR) is the indicator with the lowest achievement and therefore requires attention in the referee and judges competency development program. The research findings also indicate that the habit of using previous regulations and the limited refresher training specifically discussing the PPPSN 2025 may be related to variations in respondents' understanding. However, these factors were not directly examined in this study and therefore cannot be concluded as causes or factors influencing the level of understanding. Therefore, the Kabupaten Bungo IPSI Regional Executive Board is advised to hold regular refresher courses, case study-based regulation interpretation workshops, simulation of art category (TGR) assessment, and regular competency evaluations. These efforts are expected to strengthen understanding and support the uniform, adaptive, and consistent implementation of the PPPSN 2025 in competitions.

REFERENCES

- Abdillah, M. R., Anggara, N., & Amirudin, A. (2024). Analisis Tingkat Pemahaman Wasit Juri Kabupaten Hulu Sungai Tengah terhadap Peraturan Terbaru Pertandingan Pencak Silat dalam Kategori Tanding. *Jurnal Ilmiah Penjas*, 10(2), 298–308. <https://doi.org/https://doi.org/10.36728/jip.v10i2.3642>
- Candra, J. (2021). *Pencak Silat (Pertama)*. Deepublish.
- Darmawan, A. D., Adelliana, A., Cahyani, E. D., & Triana, A. N. (2023). Pencak Silat dan Nilai Sosial dalam Masyarakat : Literature Review Pencak Silat and Social Values in Society : Literature Review. *PENJAGA : Pendidikan Jasmani Dan Olahraga*, 4(1), 28–35. <https://doi.org/10.55933/pjga.v4i1.668>
- Hamzah, M. A., Syahputra, M., Hasian, D., Sinaga, B., Baitul, S., Sumartiningsih, S., & Akhiruyanto, A. (2026). Kontribusi Kecerdasan Emosional terhadap Kemampuan Pengambilan Keputusan Wasit Sepak Bola. *Jurnal Ilmiah STOK Bina Guna Medan*, 14(1), 13–21. <https://doi.org/https://doi.org/10.55081/jsbg.v14i1.5404>

- Hoelbling, D., Salmhofer, A., Gencoglu, C., Baranyi, R., Pinter, K., Özbay, S., Ulupinar, S., Ozkara, A. B., & Grechenig, T. (2023). JudgeED: Comparison between Kickboxing Referee Performance at a Novel Serious Game for Judging Improvement and at World Championships. *Applied Sciences*, 13(9549), 1–13. <https://doi.org/https://doi.org/10.3390/app13179549>
- Ihsan, N., Okilanda, A., Indrayuda, Keilbart, P., & Shapie, M. N. M. (2026). Is Pencak Silat Ready for the 2032 Olympics? *Ido Mov Cult J Martial Arts Anthropol*, 26(3), 67–74. <https://doi.org/10.14589/ido.26.3.7>
- Ilham, W., Musa, N. M., & Amin, R. M. (2023). Pencak Silat sebagai Warisan Budaya : Identitas Lokal Seni Silat Ulu Ambek, Sumatera Barat. *Al-Mabhats : Jurnal Penelitian Sosial Agama*, 8(1), 37–54. <https://doi.org/10.47766/almabhats.v8i1.1046>
- IPSI. (2025). Peraturan Pertandingan Pencak Silat Nasional Tahun 2025. In *Pengurus Besar Ikatan Pencak Silat Indonesia* (p. 61).
- Kartomi, M. (2011). Traditional and Modern Forms of Pencak Silat in Indonesia : The Suku Mamak in Riau. *Musicology Australia*, 33(1), 47–68. <https://doi.org/10.1080/08145857.2011.580716>
- Kittel, A., Lindsay, R., Larkin, P., Spittle, M., & Cunningham, I. (2025). The effectiveness of decision-making training in team-sport officials : A systematic review and meta-analysis. *Psychology of Sport & Exercise*, 79(November 2024), 102841. <https://doi.org/10.1016/j.psychsport.2025.102841>
- Lestari, D. S., & Sutapa, P. (2020). The Skills Development of Pencak Silat Training Model based on Traditional Games Movement. In *Proceedings Of the 3rd Yogyakarta International Seminar on Health, Physical Education, and Sport Science in Conjunction with the 2nd Conference on Interdisciplinary Approach in Sports (YISHPESS and CoIS 2019)*, 1, 217–223. <https://doi.org/10.5220/0009308702170223>
- Mascarenhas, D. R. D., Collins, D., & Mortimer, P. (2005). Elite Refereeing Performance : Developing a Model for Sport Science Support. *The Sport Psychologist*, 19, 364–379. <https://doi.org/https://doi.org/10.1123/tsp.19.4.364>
- Natalia, A. A., & Wahyudi, A. R. (2022). Faktor Non Teknis Pertandingan dalam Penilaian Juri Kepada Atlet Pencak Silat. *JSES : Journal of Sport and Exercise Science*, 4(2), 14–20. <https://doi.org/10.26740/jses.v4n2.p14-20>
- Pradana, R. W., Synthiawati, N. N., & Dharma, A. S. (2025). Pelatihan etika dan sportivitas bagi pesilat pemula di matakuliah pencak silat. *PELAPIR: Jurnal Pengabdian Masyarakat*, 1(2), 13–19. <https://doi.org/https://doi.org/10.03625/tscfn274>
- Prawibowo, M., Variel, R., Saputra, R., Leri, Pratama, F. Y., Ahmad, F., & Gunawan, S. (2026). Analisis Tingkat Pemahaman Wasit dan Juri Pencak Silat Studi Evaluasi Kompetensi. *Jurnal Pendidikan Tambusai*, 10(1), 649–651. <https://doi.org/https://doi.org/10.31004/jptam.v10i1.35944>

- Russell, S., Renshaw, I., & Davids, K. (2020). Sport arbitration as an emergent process in a complex system: Decision-making variability is a marker of expertise in national-level football referees. *Journal of Applied Sport Psychology*, 0(0), 1–43. <https://doi.org/10.1080/10413200.2020.1831651>
- Sad, F. A., Subekti, N., & Syaifullah, R. (2023). Pros and Cons of the Latest Pencak Silat Match Rules in Indonesia. *Journal Coaching Education Sports*, 4(2), 277–286. <https://doi.org/https://doi.org/10.31599/jces.v4i2.2125>
- Suryaningrum, J. A., & Shapie, M. N. M. (2025). Injury trends in Pencak Silat : Impact of regulation changes on sparring athletes. *Sport, Exercise, and Injury*, 1(1), 15–26. <https://doi.org/10.56003/sei.v1i1.511>
- Syafitri, M., Gusril, Rifki, S., & Nelson, S. (2025). Persepsi Pelaku Olahraga pada Implementasi Peraturan Pertandingan Pencak Silat Tahun 2022 dalam Meningkatkan Fair Play dan Keamanan Atlet. *Jurnal Ilmu Keolahragaan*, 3(5), 27–37. <https://doi.org/https://doi.org/10.21831/jk.vXiY.00001>
- Syahputra, E. (2021). Sistem Pendukung Keputusan Seleksi Wasit/Juri Olahraga Beladiri Pencak Silat Menggunakan Metode Profile Matching. *Journal of Computer Science and Information Technology*, 1(1), 1–9.
- Utami, P., Yusuf, Y., & Santoso, S. (2025). Manajemen Sumber Daya Manusia dalam Kejuaraan Karate: Studi Kasus Kejuaraan Karate Piala Rektor UNIS II Tahun 2025. *Journal of Scientech Research and Development*, 7(2), 12–24. <https://doi.org/10.56670/jsrd.v7i2.1173>
- Wahyuningtyas, A. T., Wahyudi, A. R., Suyoko, A., Wijono, & Nirwansyah, W. T. (2024). Analisis Tingkat Pemahaman Wasit dan Juri Pencak Silat Kabupaten Ponorogo Pada Peraturan Terbaru. *SPRINTER: Jurnal Ilmu Olahraga*, 5(1), 15–20. <https://doi.org/https://doi.org/10.46838/spr.v5i1.476>
- Wright, M. (2013). OR analysis of sporting rules – A survey. *European Journal of Operational Research*. <https://doi.org/10.1016/j.ejor.2013.03.043>