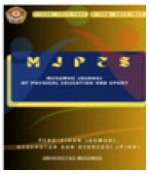
Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 3, No. 3, July 2026 , Pg. 1123-1131
DOI: 10.35724/mjpes.v8i3.7794



Local Wisdom-Based Traditional Games to Reduce Online Gaming Addiction Among Fifth-Grade Students

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Abstract
Objectives This study aims to determine and analyze the effect of implementing local wisdom-based traditional games on the level of online game addiction among fifth-grade students at SDN 70 Tolotongga.
Materials and Methods. This study employed a quantitative approach with a quasi-experimental design, specifically a one-group pretest-posttest design. The measurement instrument used was a modified Game Addiction Scale (GAS) questionnaire based on Kimberly Young's theory. The population and sample consisted of all 18 fifth-grade students at SDN 70 Tolotongga, selected via a total sampling technique. Data analysis involved descriptive statistics, the Shapiro-Wilk normality test, and a paired sample t-test conducted using IBM SPSS Statistics version 26.0.
Results. The data analysis revealed a significant decrease in online game addiction scores following the intervention. The mean score decreased sharply from 82.39 (High/Very High category) during the pretest to 41.67 (Low category) during the posttest, showing a reduction of 40.72 points. The paired sample t-test yielded a t-value of 56.741 with a significance value of 0.000 ($p < 0.05$), thereby rejecting H_0 and accepting H_a.
Conclusion. The implementation of traditional games based on local wisdom is empirically proven to significantly reduce online game addiction levels in elementary school students
Keywords: Traditional games; local wisdom; online gaming addiction; fifth-grade students; elementary education.

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Introduction

Play is a fundamental component of child development because it supports motor competence, social interaction, emotional regulation, and cognitive growth. However, rapid technological development has shifted many children's recreational activities from active and socially interactive play toward screen-based entertainment (Chiang et al., 2026; Moore, 2026; Render et al., 2025; T.-C. Wang et al., 2026). Excessive online gaming may develop into problematic behavior characterized by impaired control over gaming, prioritization of gaming over other activities, and continued participation despite negative academic, social, or psychological consequences (Çinar & Hassani, 2026; Hasan, 2025; Mokmin et al., 2025; Purwanto et al., 2025; Riyadi et al., 2025). This issue is increasingly relevant among elementary school students, whose self-regulation abilities are still developing (Moura et al., 2024; Sharma, 2025; C. Wang et al., 2023).

Previous studies have identified several adverse consequences of excessive online gaming among school-aged children. Online gaming addiction has been associated with reduced learning motivation, neglected school assignments, and diminished interest in classroom activities (Futhira et al., 2024; Grosse, 2007; Suriad, 2025; Uraipong et al., 2025). Higher gaming intensity has also been linked to poorer concentration (Donnelly et al., 2016; Kuswoyo et al., 2017; *Physical Activity, Fitness, Cognitive Function, And...*, 2024; Purnomo & Yendrizal, 2020), lower academic performance, emotional instability, limited social interaction, and behavioral problems (Chiang et al., 2026; Guarnieri et al., 2025; Mulya et al., 2025; T.-C. Wang et al., 2026). These findings demonstrate the urgency of providing practical school-based interventions that can redirect children from prolonged screen exposure toward physically active and socially meaningful activities.

Traditional games may provide an appropriate educational alternative because they combine physical movement, enjoyment, cooperation, communication, and face-to-face interaction. Group-based traditional games can strengthen children's social participation while offering an attractive substitute for gadget use (Basuki et al., 2021; Subhan, 2022). Their movement patterns, including running, jumping, pulling, and changing direction, may also promote motor coordination and active engagement (Çinar & Hassani, 2026; Kumar et al., 2025; Sukmanawati & Suherman, 2025; Uraipong et al., 2025). Moreover, repeated participation in traditional games can support interpersonal intelligence, emotional management, teamwork, sportsmanship, and self-regulation (Graham, 2025; Moore, 2026; Padilla et al., 2025; Uraipong et al., 2025).

Traditional games are particularly valuable when grounded in local wisdom. Beyond providing recreation and physical activity, they transmit cultural values such as mutual cooperation, solidarity, responsibility, fairness, and respect for others Integrating these games into school activities may therefore generate dual benefits (BuluBaan et al., 2025; Çinar & Hassani, 2026; Kurniati et al., 2025; Maulana et al., 2025). reducing children's dependence on online games while strengthening their social character and cultural identity. Schools provide a strategic setting for such interventions because they can offer structured, supervised, and developmentally appropriate activities that balance students' physical, social, and emotional needs.

Initial observations at SDN 70 Tolotongga indicated that many fifth-grade students spent approximately 4–5 hours per day playing online games, particularly *Mobile Legends* and *Free Fire*. Teachers also observed reduced classroom concentration, delayed assignment submission, and limited peer interaction during recess. These conditions indicate an immediate need for an enjoyable and contextually relevant intervention. Accordingly, traditional games such as hide-and-seek, *bentengan*, and tug-of-war were selected to redirect students' attention from screens toward active, cooperative, and culturally meaningful play.

Although previous studies have demonstrated the benefits of traditional games for children's motor, social, emotional, and character development, most have focused on general developmental outcomes. Empirical research directly testing local wisdom-based traditional games as a structured intervention for reducing online gaming addiction among elementary school students remains limited. This represents an important research gap. The novelty of the present study lies in positioning culturally rooted traditional games not merely as learning or cultural-preservation activities, but as a targeted school-based intervention for problematic online

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gaming. Therefore, this study aimed to examine changes in online gaming addiction among fifth-grade students at SDN 70 Tolotongga before and after participating in a local wisdom-based traditional-game intervention.

Materials and Methods

Study Design

This study employed a quantitative approach using a one-group pretest–posttest design. One group of participants was assessed before and after receiving a local wisdom-based traditional-game intervention. The design was represented as follows:

$$O \rightarrow X \rightarrow O$$ where O1

represents the pretest measurement of online gaming addiction, X represents the local wisdom-based traditional-game intervention, and O
2 represents the posttest measurement. Changes

Study Participants

The intervention was conducted over four weeks, with two sessions per week, resulting in eight sessions. Each session lasted approximately 60 minutes and included a warm-up, an explanation and demonstration of the game rules, group gameplay, and a cool-down. The intervention incorporated three traditional games commonly played in Bima, West Nusa Tenggara: hide-and-seek, *Benteng* (fortress game), and tug-of-war. These games were selected because they involve physical activity, cooperation, communication, competition, and direct social interaction.

Online gaming addiction was assessed before and after the intervention using an adapted Game Addiction Scale questionnaire. The instrument measured behavioral indicators associated with problematic gaming. The same questionnaire and administration procedures were applied during the pretest and posttest to maintain measurement consistency.

Study Organization

The study was conducted in three stages: pre-intervention assessment, implementation of the intervention, and post-intervention assessment. During the first stage, participants completed an online gaming addiction questionnaire adapted from Kimberly Young's theoretical framework. The questionnaire was administered under the same conditions to all participants to obtain baseline data on their online gaming behavior.

The intervention was implemented over four weeks, with two sessions per week, resulting in eight sessions. Each session lasted approximately 60 minutes and consisted of a warm-up, an explanation and demonstration of the game rules, group gameplay, and a cool-down. The program included three traditional games commonly played in Bima, West Nusa Tenggara: hide-and-seek, *Benteng* (fortress game), and tug-of-war. These games were selected because they promote physical activity, cooperation, communication, competition, and direct social interaction. All sessions were conducted in groups under researcher supervision to ensure safety and consistency of implementation.

Following completion of the intervention, the same questionnaire was administered as a posttest using procedures identical to those applied during the pretest. The pretest and posttest scores were subsequently compared to determine changes in students' online gaming addiction levels after participation in the traditional-game program.

Statistical Analysis

Descriptive statistics, including the mean, standard deviation, minimum, and maximum values, were calculated to summarize the pretest and posttest scores. The normality of the difference scores was examined using the Shapiro–Wilk test because the sample consisted of fewer than 50 participants. If the difference scores were normally distributed, a paired-samples *t* test was used to examine the difference between the

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pretest and posttest scores. If the normality assumption was not satisfied, the Wilcoxon signed-rank test was applied. Statistical significance was established at $p < .05$. An appropriate effect-size estimate was also calculated to determine the magnitude of the observed change.

Results

The mean online gaming addiction score decreased from 82.39 ± 5.71 before the intervention to 41.67 ± 3.83 after the intervention, representing a mean reduction of 40.72 points (Table 1).

Table 1. Descriptive statistics for online gaming addiction scores

Measurement	N	Mean	SD	Minimum	Maximum
Pretest	18	82.39	5.71	72	92
Posttest	18	41.67	3.83	35	50

The Shapiro–Wilk test indicated that the pretest ($W = 0.978$, $p = .923$) and posttest scores ($W = 0.973$, $p = .848$) did not significantly deviate from a normal distribution (Table 2).

Table 2. Shapiro–Wilk normality test

Measurement	*W*	*df*	*p*	Interpretation
Pretest	0.978	18	.923	Normal
Posttest	0.973	18	.848	Normal

The paired-samples *t* test showed a statistically significant difference between the pretest and posttest scores, with a mean reduction of 40.72 points, $t(17) = 56.741$, $p < .001$ (Table 3). Thus, students reported substantially lower online gaming addiction scores following the local wisdom-based traditional-game intervention.

Table 3. Paired-samples *t* test results

Comparison	Mean difference	SD of difference	*t*	*df*	*p*
Pretest–posttest	40.72	3.045	56.741	17	< .001

Note: Because the study used a one-group design without a control group, the results indicate a significant within-group reduction but should not be interpreted as definitive evidence of causality.

Discussion

This study found a substantial reduction in online gaming addiction scores among fifth-grade students following four weeks of local wisdom-based traditional games. The mean score decreased from 82.39 to 41.67, and the pretest–posttest difference was statistically significant. These findings indicate that students reported considerably fewer problematic gaming behaviors after participating in the intervention. Nevertheless, because the study employed a one-group pretest–posttest design, the observed reduction should be interpreted as a within-group change rather than definitive evidence of a causal effect.

The improvement may be explained by the characteristics of the intervention. Hide-and-seek, *Benteng*, and tug-of-war provided students with enjoyable alternatives to online gaming while involving physical movement, teamwork, competition, communication, and face-to-face interaction. These activities may have redirected students' attention from screen-based entertainment toward active participation in real-world social settings. Traditional games can also provide positive emotional experiences and opportunities to develop cooperation and communication, thereby reducing children's dependence on gadgets (Ji, 2025; Kuswoyo & Shareef, 2025; Negara & Jamilah, 2025; Usyor & Labolo, 2025).

The findings are consistent with studies demonstrating the developmental value of traditional games. (Aliriad et al., 2024; Çinar & Hassani, 2026; Mo et al., 2024; Sunanto et al., 2024) reported that interactive traditional games support children's social and emotional development, whereas emphasized their contribution to cooperation, communication, and emotional management. Traditional games involving running, jumping, pulling, and rapid changes of direction may also stimulate motor coordination and active engagement (Kurniawan et al., 2021). These combined physical, social, and emotional experiences may help explain the reduction in online gaming addiction scores observed in the present study.

The integration of local wisdom adds further educational significance. Traditional games are not merely recreational activities but also transmit cultural values such as mutual cooperation, solidarity, responsibility, fairness, and respect. Previous research has indicated that local wisdom-based games can strengthen children's character, social relationships, and cultural identity (Guo, 2025; Sukmanawati & Suherman, 2025; Triyatno et al., 2025). Therefore, the intervention may have provided a culturally meaningful form of active recreation that competed successfully with the immediate enjoyment offered by online games.

From a practical perspective, schools may incorporate supervised traditional-game sessions into physical education lessons, recess activities, or extracurricular programs. Teachers and parents should also collaborate to establish reasonable gaming limits and provide children with accessible alternatives involving physical activity and peer interaction. Traditional games are particularly suitable for schools with limited resources because they require minimal equipment and can be adapted to local environments.

Several limitations should be considered. The study included only 18 students from one school, used no control group, and evaluated outcomes immediately after a relatively short intervention. The findings may also have been influenced by self-report bias, repeated questionnaire administration, parental supervision, or other behavioral changes occurring during the study. Future research should include larger and more diverse samples, a control or comparison group, validated measures of gaming addiction, objective records of gaming duration, and longer follow-up periods. Examining intervention adherence and identifying which traditional games produce the greatest behavioral benefits would further strengthen the evidence for culturally grounded approaches to reducing problematic online gaming.

Conclusions

Local wisdom-based traditional games were associated with a significant reduction in online gaming addiction scores among fifth-grade students at SDN 70 Tolotongga. The mean score decreased from 82.39 to 41.67 after the four-week intervention ($p < .001$). These games may therefore be incorporated into school activities as an enjoyable, culturally relevant alternative to excessive online gaming. Further controlled studies with larger samples and longer follow-up periods are recommended to confirm their effectiveness.

Acknowledgments

The authors thank the principal, teachers, students, and parents of SDN 70 Tolotongga for their support and participation in this study.

Conflict of Interest

The authors declare no conflict of interest.

Funding

This research received no external funding.

References

Aliriad, H., Adi S, Manullang, J. G., Endrawan, I. B., & Satria, M. H. (2024). Improvement of Motor Skills and Motivation to Learn Physical Education Through the Use of Traditional Games. *Physical Education Theory and Methodology*, *24*(1), 32–40. https://doi.org/10.17309/tmfv.2024.1.04

BuluBaan, A., Gunawan, G., Universitas Tadulako, Abduh, I., & Universitas Tadulako. (2025). Pengaruh Penerapan Permainan Tradisional dalam Pembelajaran Terhadap Kemampuan Motorik Kasar Anak Tunagrahita. *Jurnal Porkes*, *8*(2), 742–754. https://doi.org/10.29408/porkes.v8i2.29442

Chiang, Y.-W., Chang, J.-Y., Lee, C.-H., Huang, C.-W., Wei, S.-C., Yeh, S.-M., Huang, S.-Y., Hung, W.-C., & Shyu, Y.-L. (2026). Wearable Sports Vision Training May Improve Selected Visuomotor Outcomes and Hitting Precision in Collegiate Badminton Athletes: A Randomized Controlled Trial. *Diagnostics*, *16*(12), 1769. https://doi.org/10.3390/diagnostics16121769

Çinar, M., & Hassani, F. (2026). The effects of traditional games on physical literacy among school-aged children. *Frontiers in Sports and Active Living*, *7*, 1759890. https://doi.org/10.3389/fspor.2025.1759890

Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., Lambourne, K., & Szabo-Reed, A. N. (2016). Physical Activity, Fitness, Cognitive Function, and Academic Achievement in Children: A Systematic Review. *Medicine & Science in Sports & Exercise*, *48*(6), Article 6. https://doi.org/10.1249/MSS.0000000000000901

Futhira, N., Nabila, J., & Fahrizqa, N. (2024). Active Play Beyond the Classroom: How Extracurricular Engagement Shapes Gross Motor Skills in 5-6 Year Old Children. *Journal of Education in Islamic Review*, *1*(1), 1–14. https://eduspheregloballpress.org/jeir/article/view/31

Graham, J. (2025). An examination of factors influencing teachers' fidelity to and capacity for SEL. *Social and Emotional Learning: Research, Practice, and Policy*, *6*, 100160. https://doi.org/10.1016/j.sel.2025.100160

Grosse, S. J. (2007). *Water Learning*. Human Kinetics.

Guarnieri, A., Laurenti, F., Mazzei, S., Presta, V., & Condello, G. (2025). Assessing Cognitive–Motor Performance in Table Tennis: Validity and Reliability of the Reactive Table Tennis Test. *Applied Sciences*, *15*(18), 10163. https://doi.org/10.3390/app151810163

Guo, H. (2025). Risk identification and improvement strategies for BMI and physical fitness and health grade cross-classification: A cross-sectional study based on Chinese college students. *Frontiers in Public Health*, *13*, 1660686. https://doi.org/10.3389/fpubh.2025.1660686

Hasan, I. (2025). Women's Double Burden in the Family: An Analysis of Reciprocal Relations Based on Mubādalah Theory in Central Lampung Regency. *Journal of Islamic Mubādalah*, 177–193. https://doi.org/10.70992/x11gw072

Ji, W. (2025). A study of the effects of strategies for conducting cooperative games in kindergartens on the establishment of peer relationships in preschool children. *SHS Web of Conferences*, *222*, 04002. https://doi.org/10.1051/shsconf/202522204002

Kumar, S., Bhardwaj, B., Choudhary, S., Choudhary, P. K., Addi, E. A., Sahu, K. K., Rajpoot, Y. S., Singh, D., & Pratap, B. (2025). The effectiveness of collaborative game-based learning on movement skills in physical education: A quasi-experimental study. *Physical Education of Students*, *29*(4), 258–267. https://doi.org/10.15561/20755279.2025.0402

Kurniati, Nurzamsinar, A., & Amalia, T. (2025). Traditional Games as Culturally Responsive Pedagogy: Exploring *Boy-Boy* Game for Character Building in Pancasila Education. *Journal of Local Wisdom in Education*, *1*(1), 72–86. https://doi.org/10.26618/pwgehq16

Kuswoyo, D. D., Pramono, H., & Rifai, A. (2017). Kontribusi Percaya Diri, Konsentrasi dan Motivasi terhadap Kinerja Wasit Persatuan Sepak Bola Seluruh Indonesia Provinsi Sumatera Selatan. *Journal of Physical Education and Sports*, *6*(3), Article 3. http://journal.unnes.ac.id/sju/index.php/jpes

Kuswoyo, D. D., & Shareef, Q. B. (2025). Effectiveness of Life Skill-Based Physical Education on Students' Movement Skills and Social Values. *Champions: Education Journal of Sport, Health, and Recreation*, *3*(3), 95–100. https://doi.org/10.59923/champions.v3i3.577

Maulana, I., Nugroho, S., & Nasrulloh, A. (2025). Can traditional games improve gross motor performance of elementary school students? Meta-analysis study. *Health, Sport, Rehabilitation*, *11*(1), 102–112. https://doi.org/10.58962/HSR.2025.11.1.102-112

Mo, W., Saibon, J. B., Li, Y., Li, J., & He, Y. (2024). Effects of game-based physical education program on enjoyment in children and adolescents: A systematic review and meta-analysis. *BMC Public Health*, *24*(1), 517. https://doi.org/10.1186/s12889-024-18043-6

Mokmin, N. A. M., Rassy, R. P., & Yie, D. L. (2025). Evaluating augmented reality in physical education for dyslexic students from the perspectives of teachers and students. *Scientific Reports*, *15*(1), 7682. https://doi.org/10.1038/s41598-025-92533-4

Moore, L. (2026). *Olympic sport policy as a 'sociological problem.'* https://doi.org/10.21954/OU.RO.00108092

Moura, A., MacPhail, A., Graça, A., & Batista, P. (2024). Encouraging Students to Co-Construct and Co- and Self-Regulate Their Learning Within a Cooperative Learning Environment in Physical Education. *Journal of Teaching in Physical Education*, *43*(1), 11–20. https://doi.org/10.1123/jtpe.2022-0104

Mulya, G., Nevitaningrum, N., Agustryani, R., Soraya, N., & Prabowo, T. A. (2025). Effects of technical drill and plyometric training on shot accuracy in tennis athletes aged 16–19 with different agility levels. *Pedagogy of Physical Culture and Sports*, *29*(5), 444–453. https://doi.org/10.15561/26649837.2025.0506

Negara, M. H. J., & Jamilah. (2025). Improving English Listening Skills for Vocational Students Through Interactive ICT Tools. *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature*, *13*(2), 5360–5377. https://doi.org/10.24256/ideas.v13i2.8133

Padilla, C., Katikineni, V., Park, Y., Freno, L., Laffoon, M., Reichbaum, L., Lafyatis, R., & Domsic, R. (2025). Effects of Audio-Guided Imagery on Raynaud Phenomenon in Connective Tissue Disease. *ACR Open Rheumatology*, *7*(8), e70074. https://doi.org/10.1002/acr2.70074

Physical Activity, Fitness, Cognitive Function, and...: Medicine & Science in Sports & Exercise. (2024, August 20). LWW. https://doi.org/10.1249/MSS.0000000000000901

Purnomo, A. & Yendrizal. (2020). Effect of Hand-Eye Coordination, Concentration and Believe in the Accuracy of Shooting in Petanque. *Proceedings of the 1st International Conference of Physical Education (ICPE 2019)*. 1st International Conference of Physical Education (ICPE 2019). https://doi.org/10.2991/assehr.k.200805.027

Purwanto, D., Murtono, T., Sardiman, S., & Arifyadi, A. (2025). Psychological and physiological integration in developing futsal passing skills among students. *Pedagogy of Physical Culture and Sports*, *29*(5), 475–481. https://doi.org/10.15561/26649837.2025.0509

Render, A., Mullins, M., Avant, L., Shenvi, N., Tran, T., & Jayanthi, N. (2025). Tennis 10+ Warm-Up and Cool-Down Program: A 1-Year Longitudinal Analysis of Compliance and Injury Rates in Adult Recreational Tennis Players. *Sports Health: A Multidisciplinary Approach*, 19417381251387672. https://doi.org/10.1177/19417381251387672

Riyadi, M. B., Nuryadin, I., Ardhiyanto, Y. D., Wijaya, F., & Demirci, N. (2025). Analysis of Skill Development in Throwing Placement for Indonesian National Boccia Athletes Through Structured Drill Training. *Jurnal Moderasi Olahraga*, *5*(2), 385–396. https://doi.org/10.53863/mor.v5i2.1921

Sharma, A. K. (2025). Cognitive and Psychological Aspects of Physics Learning. *Physics Journal | Farhangian University*, *2*(1), 28–39. https://doi.org/10.48310/esip.2025.18642.1011

Sukmanawati, N., & Suherman, M. (2025). Physical Education, Sports and Health Management (PJOK) in Fostering Student Achievement Through Futsal Extracurricular. *Journal of Science and Education (JSE)*, *6*(1.2), 1–15. https://doi.org/10.58905/jse.v6i1.2.687

Sunanto, S., Tuasikal, A. R. S., Indahwati, N., Suryanti, S., Himawan, A., Purwoto, S. P., & Firmansyah, I. (2024). Models of traditional games in physical education and sports: Its effect on increasing the motor devel-opment of elementary school students. *Retos*, *61*, 722–727. https://doi.org/10.47197/retos.v61.107121

Suriad, A. (2025). Meta-review of Physical Education's role in enhancing social welfare and equity among Indonesian youth. *Retos: Nuevas Tendencias En Educación Física, Deporte y Recreación*, (68), 1616–1634. https://dialnet.unirioja.es/servlet/articulo?codigo=10254034

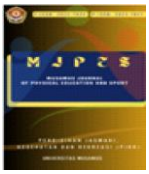
Triyatno, Ahmad Muhibbin, & Sigit Haryanto. (2025). The Effectiveness of the Adiwiyata Program in Strengthening Environmental Culture at MTs PPMI Assalaam: A Study of the CSE-UCLA Evaluation Model. *Didaktika: Jurnal Kependidikan*, *14*(4 Nopember), 6221–6234. https://doi.org/10.58230/27454312.3133

Uraipong, M., Nopas, D., & Pojsompong, C. (2025). More Than Just Games: Unequal Experiences and Evolving Attitudes Toward Physical Education in Thai Primary Schools. *Journal of Education and Learning*, *14*(5), 334. https://doi.org/10.5539/jel.v14n5p334

Usyor, J. F., & Labolo, M. (2025). *EFEKTIVITAS PENYELENGGARAAN DANA OTONOMI KHUSUS DALAM UPAYA PERCEPATAN PEMBANGUNAN BIDANG PENDIDIKAN KOTA SORONG PROVINSI PAPUA BARAT DAYA* [Diploma, Institut Pemerintahan Dalam Negeri]. http://eprints.ipdn.ac.id/24090/

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

Wang, T.-C., Liu, T.-Y., Pan, C.-Y., Tseng, Y.-T., Tang, T.-W., & Tsai, C.-L. (2026). Effects of mixed reality-based instruction on visual attention and stroke performance in novice



badminton players. *Journal of Exercise Science & Fitness*, *24*(3), 200465. https://doi.org/10.1016/j.jesf.2026.200465