EDUKASIA: Jurnal Pendidikan dan Pembelajaran
Vol. 6, 1 (June, 2025), pp. 497-508
ISSN: 2721-1150; EISSN: 2721-1169; DOI: 10.62775/edukasia.v6i1.1446

The Impact of Audio-Visual-Based Learning Media on Freestyle Swimming Ability

Raswin[1], Usman Nasution[2]

[1] Universitas Negeri Medan, Indonesia; raswin@unimed.ac.id
[2] Universitas Negeri Medan, Indonesia; usman@unimed.ac.id

ARTICLE INFO

Keywords:

Audio Visual;
Freestyle Swimming;
Learning Media

Article history:

Received 2025-05-06
Revised 2025-06-16
Accepted 2025-07-12

ABSTRACT

This research investigates the impact of audio-visual-based learning media on the freestyle swimming abilities of junior high school students in Medan City. Employing a quantitative approach with a weak experimental method, the study used a One Group Pre-test-Post-test design involving 29 students. Data were analyzed using IBM SPSS Statistics. The knowledge pre-test showed a minimum score of 20.00, a maximum of 80.00, an average of 57.25, and a standard deviation of 13.48. Post-test knowledge scores improved, with a minimum of 80.00, a maximum of 100.00, an average of 74.45, and a standard deviation of 7.59. For skills, pre-test results showed a minimum of 4.00, a maximum of 10.00, a mean of 4.26, and a standard deviation of 2.10. Post-test results showed improvements with a minimum of 6.00, a maximum of 15.00, a mean of 7.45, and a standard deviation of 3.08. The findings indicate that using audio-visual media significantly improved student learning outcomes in freestyle swimming, with knowledge increasing by 51.80% and skills by 31.55%.

Corresponding Author:
Raswin
Universitas Negeri Medan, Indonesia; raswin@unimed.ac.id.

1. INTRODUCTION

Physical education (PE) serves as a fundamental component in the holistic development of students, aiming not only to improve physical fitness but also to cultivate cognitive abilities, emotional intelligence, social skills, and lifelong healthy habits. According to (Dewi & Faridah, 2022) and (Endriani et al., 2022), PE is a structured educational process that incorporates purposeful physical activity to promote comprehensive personal growth. Recent perspectives emphasize that physical activity should not be limited to skill acquisition but must also contribute to students' understanding of health concepts and developing positive attitudes toward an active lifestyle. In this sense, physical education is a preventive health measure and a formative educational experience.

In the school setting, Physical Education, Sports, and Health—commonly referred to in Indonesia as PJOK—play a pivotal role in shaping students' physical, emotional, and social well-being. (Antoni et al., 2021) and (Haoran et al., 2023) highlight that PJOK helps children manage stress, develop resilience, and build teamwork through structured and engaging physical activities. These experiences promote cardiovascular and muscular health and enhance students' ability to communicate, cooperate, and empathize with others. (Hasanah & Rahmatullah, 2024) further argue that well-implemented PJOK programs support students' mental health and academic performance by offering an active outlet for emotional expression and stress regulation.

Experiential learning through sport, play, and physical movement lies at the heart of effective physical education. (Dewi & Verawati, 2021) note that such learning is rooted in active participation, where students gain a firsthand understanding of concepts like fair play, effort, discipline, and strategic thinking. These elements are more effectively internalized when learners actively participate in physical tasks rather than passively observe. Moreover, physical education provides a safe space for trial and error, allowing students to learn from their failures and celebrate progress, which is vital for building self-confidence and a growth mindset.

Ultimately, physical education embodies a holistic approach to learning that integrates the mind, body, and spirit. (Aquino, 2023) and (Palomaria & Aquino, 2023) emphasize that physical activity is not merely a supplement to academic learning but a core medium for developing essential life skills and values. Through physical education, students are equipped to lead healthy, active, and meaningful lives—prepared for academic success and lifelong personal and social well-being. PE should be regarded as a critical element of the overall education system, meriting thoughtful implementation and support from educators, policymakers, and communities.

Among the various topics taught in physical education, swimming is one of the essential components. Swimming involves moving the body through water using coordinated movements and keeping oneself afloat (Francavilla et al., 2024; Sanjaya & Rediani, 2022; Sin & Hudayani, 2020). It serves multiple purposes, including recreation, relaxation, and competitive achievement. All age groups highly favor swimming due to its physical and mental benefits, such as enhancing fitness, promoting calmness, and increasing enjoyment. Moreover, swimming improves safety, rehabilitation, endurance, and muscle strength (Miguel-Ortega et al., 2024; Sinclair & Roscoe, 2023; Wahyudin, 2021).

There are four primary swimming styles: butterfly, backstroke, breaststroke, and freestyle (Purwanti & Safitri, 2019; Syahrastani, 2022). Festyle is generally considered the most suitable for beginners due to its relatively more straightforward technique (Guignard et al., 2017; Mehta & Singha, 2024; Negara et al., 2023). Freestyle swimming involves body coordination with emphasis on arm swings, body position facing down, and rhythmic breathing, forming a fundamental basis for swimming proficiency (Negara et al., 2023; Rezki et al., 2022). Because it is faster and easier to learn, freestyle is often used in competitions and is essential for building foundational swimming skills.

Despite the recognized benefits of swimming, the teaching process encounters several challenges. These include limited access to swimming pools, insufficient training time, lack of teaching aids, and students' varying readiness levels and fear of water (Rizky et al., 2022). Additionally, many parents of young swimmers often have unrealistic expectations for immediate success in competitions without fully understanding the training process required. This results in pressure that may hinder rather than support learning. Moreover, students often struggle to balance academic activities with training schedules, adding another layer of complexity to swimming instruction (Sugiyanto et al., 2024).

Audio-visual media has been introduced as a promising solution to address these challenges. Audio-visual media provides a learning experience through visual and auditory stimuli, allowing students to observe movements, understand techniques, and replicate them in practice (Hnedrawati et al., 2024). Videos in swimming education present content in a more engaging and accessible format, improving comprehension and retention (AlShaikh et al., 2024; Anto et al., 2019). Studies have shown that such media increases student motivation and participation, key factors in mastering swimming techniques (Ginting et al., 2021; Santosa et al., 2024).

Specifically, video learning media has been proven effective in enhancing performance in breaststroke and freestyle swimming (Fernando et al., 2018; Nugraha et al., 2023). Previous research has also found that audio-visual materials, when combined with physical drill practices, significantly improve both cognitive and psychomotor learning outcomes in swimming (Bagaskoro et al., 2024; Prasetiyo et al., 2024; Rizkanto & Rusdiawan, 2021). However, most prior studies have focused on either theoretical aspects or isolated drills without integrating them into a cohesive instructional model that combines real footage, theoretical explanation, and engaging delivery.

This reveals a gap in current research—namely, the lack of audio-visual learning media that holistically combines theoretical and practical aspects attractively and functionally for elementary or junior high school students. Moreover, existing studies often target older students or professional athletes, whereas the learning needs of younger beginners remain underexplored. Hence, there is a need for a more structured, video-based instructional model specifically designed for younger learners to master freestyle swimming.

The present study aims to bridge this gap by developing and analyzing a video-based freestyle swimming training model that integrates theoretical explanations and practical demonstrations. This model enhances students' mastery and speed in freestyle swimming. The video includes key elements such as body position, arm movements, breathing techniques, leg coordination, and synchronized movement patterns—presented in an engaging, age-appropriate manner that can be accessed both in and out of the classroom.

It is expected that using this media will not only improve students' understanding of the technique but also foster greater confidence and reduce fear of water. Assistive tools like swim boards and pull buoys are also integrated into learning to facilitate motor learning, build trust, and create a joyful experience (Iqbal et al., 2025; Nugraha et al., 2023). Students can enhance their freestyle swimming performance through repetition and guided practice.

Therefore, the primary objective of this study is to evaluate the effectiveness of using audio-visual-based video media in improving the knowledge and skills of freestyle swimming among junior high school students. By offering a comprehensive and student-centered learning model, this research aims to contribute to developing effective instructional strategies in physical education, particularly in aquatic sports for beginners.

2. METHODS

This study employed a quantitative research approach using a weak experimental design, specifically the One Group Pre-test–Post-test design. This type of design is commonly used to examine causal relationships by comparing the conditions of a single group before and after treatment without the presence of a control group (Sugiyono, 2017).

A control group was not used in this study because the chosen design was the *One Group Pre-test–Post-test Design*, which explicitly involves only one group to measure changes before and after the treatment without a comparison group. This design is considered sufficient to determine the direct effect of the treatment on the same group. In addition, practical and ethical considerations played an important role, as the study was conducted in a school setting using intact classes, making it potentially unfair and inefficient to divide students into control and experimental groups. Although there was no control group, pre-tests, and post-tests still allowed the researcher to evaluate learning improvement quantitatively.

This research aims to determine the effect if students are given treatment.

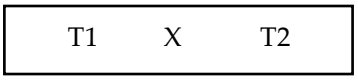

Figure 1. One Group Pre-test-Post-test Design

Information :

T1 = Pre-test
X = Treatment
T2 = Post-test

The research focused on determining the impact of audio-visual learning media on students' cognitive and psychomotor outcomes in freestyle swimming—the treatment involved using instructional video media that presented theoretical explanations and real demonstrations of swimming techniques.

The population in this study consisted of 210 seventh-grade students from various junior high schools in Medan City. The researcher applied a simple random sampling technique through a lottery system to select the sample. Each class leader was asked to draw a folded paper from a container, where several papers were marked with the word "sample." If a class leader picked a paper with that mark, the entire class represented by that leader was included in the sample. This process continued until the number of students reached 29, who then became the participants in the study. Using intact classes ensured that the intervention could be delivered uniformly and efficiently.

The data collection technique involved administering pre-tests and post-tests to measure students' knowledge and skills related to freestyle swimming. The pre-test was conducted before the intervention to assess students' initial abilities, while the post-test was given after the treatment to determine any improvements. The learning media in the treatment included videos explaining body position, arm and leg movements, breathing techniques, and overall movement coordination in freestyle swimming. These videos were accessed during scheduled learning sessions, and the students practiced the techniques under teacher supervision.

To analyze the data, the researcher used IBM SPSS statistical software. The analysis procedures included descriptive statistics to summarize the data normality tests to assess data distribution. They paired sample t-tests to determine the significance of differences between pre-test and post-test results. Additionally, the gain score was calculated to measure the magnitude of improvement, and the results were classified (low, medium, or high) based on percentage increases. This combination of quantitative methods allowed the researcher to conclude the effectiveness of the audio-visual media in enhancing students' swimming performance..

3. FINDINGS AND DISCUSSION

Here is the demographic data of the research participants, including gender and initial swimming ability. The data describes the characteristics of the 29 students involved in this study, with a reasonably balanced gender composition and all participants being at the beginner level in swimming freestyle for a distance of 25 meters.

Table 1. Demographic Data of Research Participants

No.	Variable	Category	Frequency (n)	Percentage (%)
1	Gender	Male	16	55.2%
		Female	13	44.8%
2	Initial Swimming Ability	Able to swim 25m	0	0.0%
		Unable to swim 25m	29	100.0%

The results obtained from the research have to be supported by sufficient data. The research results and the discovery must be the answer or the research hypothesis stated previously in the introduction. The research results begin with a description of the validation results, starting with a description of the validation results of the learning media used in this research. Validation was carried out by learning media experts and swimming material experts. The validation results show that the learning media used received a proportion value of 91.20%, which is in the valid category. Next, descriptive analysis

and normality of data on learning outcomes of swimming knowledge and skills are explained. The results of the study can be seen in Table 2 as follows.

Table 2. Value of Descriptive Analysis Results and Data Normality

Aspect	Hands	N	Min	Max	Mean	SD
Knowledge	Pre	29	20.00	80.00	57.25	13.48
	Post	29	80.00	100.00	74.45	7.59
Skills	Pre	29	4.00	10.00	4.26	2.10
	Post	29	6.00	15.00	7.45	3.08

From Table 1, the results of the knowledge data on pre-test scores show a minimum value of 20.00, max of 80.00, mean of 57.25, and std deviation of 13.48. As for the knowledge post-test results, the min value was 80.00, max 100.00, mean 74.45, and std deviation 7.59. The results of the pre-test skills data obtained were as follows: min 4.00, max 10.00, mean 4.26, and std—deviation 2.10. The results of the skills post-test obtained a min value of 6.00, a max of 15.00, a mean of 7.45, and a std deviation of 3.08.

Table 3. Paired Sample T-Test Data Analysis

Aspect	t	Say.	The knot
Knowledge	9.085	0.000	Different
Skills	6.643	0.000	Different

Table 2 shows the paired test data sample. The t-test on the knowledge and skills aspect has a sig of 0.000 below 0.05, which shows differences in learning outcomes for freestyle swimming knowledge and skills using audio-visual media.

Table 4. *N-gain* Score Percent

Aspect	hand	Mean.		N- Gain Score	The knot
Knowledge	Pre	57.17	16.26	51.80%	Currently
	Post	74.45			
Skills	Pre	4.26	2.16	31.55%	Currently
	Post	7.42			

Table 4 shows the results of the *N-gain* calculation in the knowledge aspect, obtaining an *N-gain* score of 51.80% so that the pre-test and post-test increase values are in the medium range. The *N-gain* result was 31.55% in the skills aspect, so the pre-test and post-test improvement values were in the medium range. So it can be concluded that after being given treatment or behavior, Student learning outcomes in freestyle swimming learning knowledge increased by 51.80% while skills increased by 31.55%.

This research examined the effect of audiovisual media and assistive tools on students' freestyle swimming learning outcomes. The experiment used a pre-test and post-test design to focus on cognitive (knowledge) and psychomotor (skills) aspects. After implementing audiovisual media and swimming aids, the results showed a significant improvement, with a p-value of 0.000 ($p < 0.05$), indicating a meaningful difference between students' performance before and after the treatment. Specifically, the knowledge aspect increased by 52.82%, and the skills aspect improved by 32.57%, both categorized as medium improvements. These findings suggest incorporating multimedia learning and physical support tools can positively influence students' comprehension and performance, especially in complex motor skills like swimming. Audiovisual media served as an effective instructional strategy by

allowing students to visualize proper techniques, making abstract movements more concrete and easier to follow.

According to media learning theory, audiovisual tools are particularly beneficial because they merge visual and auditory stimuli, which can cater to multiple learning styles and improve retention (Sholihah & Rohmani, 2024). In this study, students engaged with instructional videos demonstrating freestyle swimming techniques, which helped them visually understand the correct body positions, arm and leg movements, breathing techniques, and overall movement coordination. By repeatedly watching these demonstrations, students could build mental models of ideal swimming form, which they could apply during physical practice. This mental-visual rehearsal, combined with the physical support of swimming aids like kickboards and pull buoys, helped reduce anxiety in the water, boost confidence, and gradually improve students' movement accuracy and stamina. As a result, the learning process became more structured, engaging, and effective.

The instructional videos used in this study were designed to be easily accessed through various digital devices such as mobile phones, laptops, and desktop computers. This ensured flexibility for students to engage with the material inside and outside the classroom setting. By accommodating diverse learning environments, the audiovisual content empowered students to learn at their own pace, repeat difficult segments, and mentally rehearse the techniques before practicing them physically. The videos included two specific variations—freestyle swimming with assistive tools and without them—providing clear visual distinctions between supported and independent performance. This helped students grasp the role of each tool in developing proper form and technique, reinforcing the theoretical knowledge gained during class instruction.

Physical learning aids, particularly swim boards and pull buoys, were essential to the instructional design. These tools supported students in maintaining buoyancy and correct body alignment during swimming practice, which is especially critical for beginners who struggle with water confidence or coordination. As noted by Ginting et al. (2021), assistive learning devices contribute to technical performance and students' emotional readiness by creating a safer and more supportive learning environment. In this context, the swim boards helped stabilize body posture. At the same time, pull buoys allowed learners to isolate arm movements and practice stroke mechanics without the added challenge of maintaining complete body control.

Before the treatment phase of the study, none of the 33 participating students could swim a complete 25-meter freestyle distance using the correct technique. However, measurable improvements were observed after instruction that combined audiovisual materials with hands-on practice using assistive tools. Four students successfully completed the 25-meter distance with proper form, demonstrating endurance and the accurate execution of freestyle movements. Meanwhile, the remaining students displayed notable progress in their technique—even if they had not yet achieved the full distance—by exhibiting improved body coordination, regulated breathing patterns, and greater balance in the water. These outcomes reflect a substantial shift from the basic, unstructured movement toward a more synchronized swimming style.

Moreover, audiovisual materials contributed significantly to building students' confidence in the water. Demonstrations of proper swimming technique helped them form mental blueprints of the desired performance, particularly useful for learning complex motor skills. These mental visualizations allowed students to anticipate movements before performing them physically, minimizing hesitation and enhancing execution. At the same time, repeated practice sessions using swim boards and pull buoys allowed students to familiarize themselves with water resistance, movement rhythm, and body control. This structured approach reduced anxiety, increased engagement, and cultivated a sense of accomplishment that motivated students to continue improving. As such, integrating visual instruction and physical support created a comprehensive and practical learning environment for mastering the fundamentals of freestyle swimming.

The combination of audiovisual guidance and repetitive practice allowed students to internalize fundamental movements gradually. Exercises focused on body position, arm and leg movements,

breathing control, and full coordination were repeated with direct supervision. This allowed for correction, reinforcement, and consistent progress over time. Students were not only engaged cognitively through video content but also physically trained through guided movement using assistive tools. This dual approach enriched the learning experience and made abstract swimming concepts tangible and achievable.

Several factors were found to influence learning outcomes. Internal factors included students' health, readiness, and motivation. A student who is physically fit, mentally alert, and genuinely interested in learning is more likely to show significant progress. On the other hand, external factors—such as teacher guidance, support from the research team, and the availability of audiovisual media and tools—also played an essential role in shaping the overall learning environment. Using videos and aids helped eliminate students' fear of water, built self-confidence, and made the learning experience enjoyable and effective.

The findings of this study are strongly aligned with prior research that emphasizes the effectiveness of audiovisual media in enhancing swimming instruction. For example, Amalia et al. (2023) found that using audiovisual content significantly improved students' freestyle swimming performance, particularly in understanding movement sequences and executing techniques correctly. This suggests that when students are exposed to explicit visual representations and auditory explanations, they can better conceptualize and replicate complex physical actions. In the present study, similar outcomes were observed, as students gained a more accurate understanding of freestyle techniques after repeatedly watching instructional videos that illustrated proper form, coordination, and timing.

In support of these results, other scholars have highlighted the value of multimedia in physical education. (Imansyah et al., 2022) reported that digital media tools had a measurable impact on students' learning outcomes in aquatic sports, providing learners with both cognitive clarity and motivational support. Likewise, (Nugroho & Khory, 2020) emphasized how video-based instruction allows for repeated viewing and self-paced learning, helping students internalize movement patterns more effectively. These insights strengthen the current study's argument that audiovisual media can be a powerful educational tool, especially for beginners who struggle with visualizing and executing technical swimming skills without guided demonstrations.

In addition to audiovisual instruction, physical assistive tools such as swim boards and pull buoys have been proven effective in facilitating swimming education. (Fernando et al., 2018) highlighted the importance of these tools in helping students achieve proper body alignment and buoyancy, which are critical for developing confidence and reducing fear in the water. Iqbal et al. (2025) further reinforced this by noting that assistive devices contribute to better muscle coordination and allow students to focus on individual components of swimming, such as leg kicks or arm pulls, without becoming overwhelmed. In the context of this study, swim boards and pull buoys served not only as learning aids but also as psychological support mechanisms that increased students' willingness to engage in aquatic activities.

The convergence between this study's findings and existing literature underscores the importance of integrating audiovisual media and assistive tools into physical education, particularly swimming instruction. This dual approach addresses the multifaceted nature of learning to swim, which involves cognitive understanding and psychomotor execution. By combining mental modeling through videos with tactile reinforcement through physical tools, students are more likely to achieve comprehensive and sustainable progress. These results offer substantial pedagogical implications and encourage educators to adopt blended methods that cater to diverse learning needs and enhance student outcomes in skill-based environments.

Through repeated exposure and hands-on experience, students could transition from basic understanding to more advanced application. Audiovisual learning served as a mental rehearsal, allowing students to visualize ideal movements before entering the pool. This mental modeling and physical support from assistive tools enabled learners to refine their techniques gradually. The sense of

achievement gained through incremental success boosted motivation and encouraged students to persist despite challenges (Shen et al., 2024).

Students' experiences during practice revealed that audiovisuals improved their grasp of techniques and timing, while the swim board and pull buoy assisted in mastering body control and movement rhythm. Even for those who struggled initially, the sense of progress contributed positively to their attitude and willingness to learn. The visual component clarified abstract instructions, while physical aids offered security and practical support.

Freestyle swimming, as a complex motor skill, requires a combination of cognitive comprehension and physical coordination (Minkels et al., 2025; Sinclair & Roscoe, 2023). Therefore, instructional methods must address both aspects simultaneously. The study proves combining digital media with hands-on tools provides a holistic approach to teaching swimming effectively. By engaging both the mind and body, students become active participants in their learning journey, which enhances outcomes and builds a stronger foundation for future development.

This study demonstrates that audiovisual media and swimming aids significantly influence students' learning outcomes in freestyle swimming. Integrating visual instruction and physical tools offers a comprehensive strategy that improves knowledge and skills. This dual-method approach can be recommended for broader implementation in physical education programs, especially beginner-level swimming instruction. It provides technical skill enhancement and emotional and motivational support crucial for student success in practical, skill-based learning environments.

4. CONCLUSION

This research concludes that the improvement in students' knowledge of freestyle swimming was moderate, indicating a meaningful increase from their initial understanding before the intervention. The learning process effectively enhanced students' cognitive grasp of essential concepts related to freestyle swimming, such as proper techniques, body positioning, and breathing control. This suggests that the instructional methods and materials used were successful in helping students develop a more transparent and more profound comprehension of the subject matter.

The improvement in students' swimming skills also fell within a moderate range, demonstrating a noticeable advancement in their physical ability to perform freestyle swimming techniques. The treatment provided, which included audiovisual media and assistive tools, supported students in gradually refining their motor skills, coordination, and confidence in the water. Overall, these results indicate that the learning intervention positively impacted both the cognitive and psychomotor domains of freestyle swimming, contributing to well-rounded student progress in this sport.

It is recommended that schools and physical education teachers continue to integrate audiovisual media and swimming aids into the swimming learning process, especially for beginners. The use of this combined method not only effectively enhances students' theoretical understanding but also their practical skills. In addition, consistent training and intensive guidance during practice are essential to strengthen motor skills and build students' confidence in the water. Support from various parties, including parents and adequate facilities, is also necessary to ensure the learning process runs optimally and the results can be maximized.

REFERENCES

AlShaikh, R., Al-Malki, N., & Almasre, M. (2024). The implementation of the cognitive theory of multimedia learning in the design and evaluation of an AI educational video assistant utilizing large language models. *Heliyon*, *10*(3), e25361. https://doi.org/10.1016/j.heliyon.2024.e25361

Amalia, R., Nur, S., & Zainuri, M. I. (2023). The Effect of Resistance Band Exercises Through Audio Visual on Learning Freestyle swimming at Club Garuda Laut Palopo. *ACTIVE: Journal of Physical Education, Sport, Health and Recreation*, *12*(3), 247–253. https://doi.org/10.15294/active.v12i3.70032

Anto, E., Sugiyanto, S., & Liskustyawati, H. (2019). Development of Video Modelling of Freestyle Swimming in High School Physical Education. *International Journal of Multicultural and Multireligious Understanding*, *6*, 332. https://doi.org/10.18415/ijmmu.v5i5.583

Antoni, M. S., Guntur, G., Festiawan, R., Nugraha, A. I., & Nurhadi, F. I. (2021). Rockport walking fitness test apps: Application of cardiorespiration fitness test with rockport method android based. *MEDIKORA*, *20*(1), 23–35. https://doi.org/10.21831/medikora.v20i1.34960

Aquino, J. M. D. (2023). Assessing the Role of Recreational Activities in Physical Education Participation of College Students in One State University in Laguna Philippines. *International Journal of Multidisciplinary Sciences*, *1*(2), 190–204. https://doi.org/10.37329/ijms.v1i2.2506

Bagaskoro, K. P., Tarigan, H., Kurniawan, C., & Nurseto, F. (2024). The Effect of Visualization Learning and Practice on Freestyle Swimming Speed in Children Aged 10-13 Years. *Halaman Olahraga Nusantara : Jurnal Ilmu Keolahragaan*, *7*(2), 607–617. https://doi.org/10.31851/hon.v7i2.15441

Dewi, R., & Faridah, E. (2022). Method and Motivation in Teaching Elementary School Students to Throw and Catch the Ball. *AL-ISHLAH: Jurnal Pendidikan*, *14*(3), 3507–3516. https://doi.org/10.35445/alishlah.v14i3.1635

Dewi, R., & Verawati, I. (2021). The Effect of Manipulative Games to Improve Fundamental Motor Skills in Elementary School Students. *International Journal of Education in Mathematics, Science and Technology*, *10*(1), 24–37. https://doi.org/10.46328/ijemst.2163

Endriani, D., Sitompul, H., Mursid, R., & Dewi, R. (2022). Development of a Lower Passing Model for Volleyball Based Umbrella Learning Approach. *International Journal of Education in Mathematics, Science and Technology*, *10*(3), 681–694. https://doi.org/10.46328/ijemst.2508

Fernando, H., Soegiyanto, S., & Kusuma, D. W. Y. (2018). Swimming Coached Management Program of Indonesian Swimming Association in South Sumatera. *Journal of Physical Education and Sports*, *7*(1), 55–59. https://doi.org/10.15294/jpes.v7i1.23301

Francavilla, V., Parisi, M. C., Mary, M. P., Zoffoli, A., Coco, M., Di Corrado, D., & Zieliński, R. (2024). Effects of different swimming styles on postural assessment in mid-level young swimmers. *European Journal of Translational Myology*. https://doi.org/10.4081/ejtm.2024.13150

Ginting, A., Asmawi, M., Tangkudung, J., Raswin, & Lengkana, A. S. (2021). The Effectiveness of Learning Freestyle Swimming Using the ISLAMT2E Based on Static Swimming Tools. *International Journal of Human Movement and Sports Sciences*, *9*(5), 863–875. https://doi.org/10.13189/saj.2021.090506

Guignard, B., Rouard, A., Chollet, D., & Seifert, L. (2017). Behavioral Dynamics in Swimming: The Appropriate Use of Inertial Measurement Units. *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.00383

Haoran, J., Karungaru, S., & Terada, K. (2023). AI Fitness Coach at Home Using Image Recognition. *International Journal of Human Movement and Sports Sciences*, *11*(4), 850–857. https://doi.org/10.13189/saj.2023.110419

Hasanah, A. U., & Rahmatullah, M. I. (2024). The Effect of Physical Education on Students' Mental Health. *Journal of Physical Education Innovation*, *1*(2), 41–45. https://doi.org/10.55081/jopei.v1i2.3444

Hnedrawati, E. S., Syahrial, & Widiowati, A. (2024). Penerapan Media Pembelajaran Berbasis Video Dalam Meningkatkan Motivasi Belajar Siswa Pada Mata Pelajaran Matematika di Kelas I A SD Negeri 108/VIII Sari Mulya. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, *9*(1), 4864–4875. https://doi.org/10.23969/jp.v9i1.13107

Imansyah, F., Handayani, W., & Manullang, J. G. (2022). Development of Video-Based Teaching Materials for Swimming Learning. *Halaman Olahraga Nusantara : Jurnal Ilmu Keolahragaan*, *5*(1), 227–241. https://doi.org/10.31851/hon.v5i1.7205

Iqbal, M., Prakoso, B., Hartoto, S., & Khory, F. (2025). The effect of swimming learning aids on swimming learning outcomes for children aged 6-8 years. *Sriwijaya Journal of Sport*, *4*(2), 176–189. https://doi.org/10.55379/sjs.v4i2.34

Mehta, D., & Singha, R. (2024). The primary mechanisms behind swimming. *International Journal of Physical Education, Sports and Health*, *11*(5), 460–464.

Miguel-Ortega, Á., Calleja-González, J., & Mielgo-Ayuso, J. (2024). Endurance in Long-Distance Swimming and the Use of Nutritional Aids. *Nutrients*, *16*(22), 3949. https://doi.org/10.3390/nu16223949

Minkels, C., van der Kamp, J., de Vries, R., & Beek, P. J. (2025). Learning how to swim in 5- to 12-year-old children: A scoping review of evidence-based motor learning methods. *Frontiers in Sports and Active Living*, *7*. https://doi.org/10.3389/fspor.2025.1505301

Negara, F. B., Raharjo, H. P., Sumartiningsih, S., & Wahyudi, A. (2023). The Effect of Swimming Style Training on Personality and Swimming Ability in Beginners in Rejang Lebong—Bengkulu. *Journal of Physical Education and Sports*, *12*(1), 8–13. https://doi.org/10.15294/jpes.v12i1.73673

Nugraha, M. S., Hartati, H., Victorian, A. R., & Safitri, E. (2023). Development of Measuring Tools For Swimming Physical Tests on Students Physical Education. *ACTIVE: Journal of Physical Education, Sport, Health and Recreation*, *12*(2), 153–159. https://doi.org/10.15294/active.v12i2.69081

Nugroho, F. A., & Khory, F. D. (2020). Pengaruh Media Audio Visual Dan Latihan Drill Terhadap Hasil Belajar Renang Gaya Dada. *Jurnal Pendidikan Olahraga Dan Kesehatan*, *8*(3), 137–142.

Palomaria, J. A. R., & Aquino, J. M. D. (2023). Improving physical education in higher education institutions in the Philippines: Examining teachers' roles and perceptions in the implementation of CHED Memo No. 39, S. 2021. *Edu Sportivo: Indonesian Journal of Physical Education*, *4*(2), 97–113. https://doi.org/10.25299/es:ijope.2023.vol4(2).11788

Prasetiyo, A. T., Wiyarno, Y., & Rufi'i, R. (2024). The Effect of Audiovisual and Demonstration Towards Students Swimming Ability of Navy's Cadets. *Journal of Education and Teaching (JET)*, *5*(3), 291–300. https://doi.org/10.51454/jet.v5i3.447

Purwanti, A. S., & Safitri, R. (2019). Hubungan Antara Aktivitas Fisik dengan Dysmenorrhea Primer Pada Atlet Dan Non Atlet Renang Remaja Putri Usia 12-16 Tahun di Club Orca Gajahyana Kota Malang. *Siklus : Journal Research Midwifery Politeknik Tegal*, *8*(2), 116–121. https://doi.org/10.30591/siklus.v8i2.1344

Rezki, R., Zulkifli, Z., Jatra, R., & Aprianti, L. (2022). An Analysis Of Freestyle Swimming Technique on Students the Physical Education, Health And Leisure Study Program. *INSPIREE: Indonesian Sport Innovation Review*, *3*(02), 93–105. https://doi.org/10.53905/inspiree.v3i02.78

Rizkanto, B. E., & Rusdiawan, A. (2021). Kinematics analysis of freestyle swimming athletes at the 2019 Indonesia Open Aquatic Championship (IOAC). *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran*, *7*(2), 206–218. https://doi.org/10.29407/js_unpgri.v7i2.15877

Rizky, H. M., Saifudin, A., & Makrifah, I. A. (2022). Pengembangan Media Video Pembelajaran pada Materi Renang Gaya Bebas Kelas VII di MTs Sunan Kalijogo. *Patria Educational Journal (PEJ)*, *2*(1), 94–105. https://doi.org/10.28926/pej.v2i1.254

Sanjaya, P. M. D., & Rediani, N. N. (2022). Pembelajaran Berbantuan Video Model Latihan Renang Gaya Bebas Terhadap Penguasaan Gaya Bebas dan Kecepatan Renang Siswa Sekolah Dasar. *Jurnal Penelitian Dan Pengembangan Pendidikan*, *6*(2), 295–303. https://doi.org/10.23887/jppp.v6i2.50248

Santosa, E., Sukmawati, F., Juwita, R., Prihatin, R., Cahyono, B., & Suparmi. (2024). The Effect of Teachers' Level of Self-Regulated Learning and Internet Self-Efficacy on Teaching Innovation in the Constructivist Curriculum. *JTP - Jurnal Teknologi Pendidikan*, *26*(2), 657–675. https://doi.org/10.21009/jtp.v26i2.48474

Shen, B., Bai ,Barry, Wang ,Jing, & and Song, H. (2024). Relations between motivation, social and emotional learning (SEL), and English learning achievements in Hong Kong primary schools. *Cambridge Journal of Education*, *54*(4), 417–436. https://doi.org/10.1080/0305764X.2024.2367484

Sholihah, M. & Rohmani. (2024). Analysis of the Effectiveness of Using Audio Visual Media in Science Learning in Elementary Schools. *Journal of Psychology and Instruction*, *8*(3). https://doi.org/10.23887/jpai.v8i3.79669

Sin, T. H., & Hudayani, F. (2020). The influence of swimming learning method using swimming board towards students' interest in freestyle. *Jurnal Keolahragaan*, *8*(2). https://doi.org/10.21831/jk.v8i2.34412

Sinclair, L., & Roscoe, C. M. P. (2023). The Impact of Swimming on Fundamental Movement Skill Development in Children (3–11 Years): A Systematic Literature Review. *Children*, *10*(8), 1411. https://doi.org/10.3390/children10081411

Sugiyanto, F., Pangastuti, N. I., & Sujarwo, S. (2024). Strategies for improving student swimming skills using training methods and media. *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran*, *10*(2), 202–215. https://doi.org/10.29407/js_unpgri.v10i2.23330

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. CV. Alfabeta.

Syahrastani, S. (2022). Differences in the three swimming style learning outcomes from gender. *JPPI (Jurnal Penelitian Pendidikan Indonesia)*, *8*(1), 76. https://doi.org/10.29210/020221590

Wahyudin, R. (2021). Model Pembelajaran Keterampilan Renang Gaya Bebas Untuk Pemula Kelompok Umur 4-5 Tahun. *E-Jurnal Pendidikan Mutiara*, *6*(1), 5–16.