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The effectiveness of using digital animated videos in teaching underhand passing in volleyball at SMK 1 Jenangan, Ponorogo Regency

Bayu Purwo Adhi[1]*, Arief Abdul Malik[2], Indra Sholehudin[3], Agus Martins[4]

[1] Faculty of Teacher Training and Education, Nugroho Doctoral University, Indonesia
[2] Faculty of Teacher Training and Education, Siliwangi University, Indonesia
[3] Pasundan College of Teacher Training and Education, Indonesia
[4] IOB (Institute of Business), Rua Praia dos Coqueiros, Dili, Timor Leste
*Corresponding Author. Email: bayupurwo@udn.ac.id

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Abstrak: Penelitian ini bertujuan untuk menganalisis efektivitas penggunaan video animasi digital dalam meningkatkan keterampilan teknik passing bawah bola voli siswa SMK 1 Jenengan Kabupaten Ponorogo. Penelitian ini menggunakan metode Penelitian Tindakan Kelas (PTK) dengan desain siklus yang terdiri dari tiga tahap, yaitu pra-siklus, siklus I, dan siklus II. Setiap siklus melibatkan penggunaan video animasi digital sebagai media pembelajaran untuk memperagakan gerakan teknik passing bawah secara lebih jelas dan terstruktur. Data dikumpulkan melalui observasi terhadap keterampilan teknik passing bawah siswa yang diukur dengan menggunakan Kriteria Ketuntasan Minimal (KKM). Hasil penelitian menunjukkan adanya peningkatan signifikan dalam hasil belajar siswa dari pra-siklus ke siklus II. Pada pra-siklus, hanya 40% siswa yang mencapai KKM, sedangkan pada siklus II, jumlah siswa yang tuntas mencapai 85,71%. Peningkatan ini menunjukkan bahwa video animasi digital efektif dalam membantu siswa memahami dan mempraktikkan teknik dasar bola voli, terutama dalam meningkatkan keterampilan psikomotorik. Dengan demikian, penggunaan video animasi digital dapat menjadi alternatif media pembelajaran yang efektif dalam mengajarkan keterampilan olahraga di tingkat SMK.
Kata kunci: Video animasi digital, Keterampilan passing bawah, Bola voli, Penelitian tindakan kelas, Media pembelajaran, SMK.

Abstract: *This study aims to analyze the effectiveness of utilizing digital animation videos in improving the underhand passing skills of students at SMK 1 Jenengan, Ponorogo Regency. The research employs the Classroom Action Research (CAR) method, utilizing a cycle design consisting of three stages: pre-cycle, Cycle I, and Cycle II. Each cycle involves the use of digital animation videos as a learning medium to demonstrate the underhand passing technique in a more transparent and structured manner. Data were collected through observations of students' underhand passing skills, which were measured utilizing the Minimum Mastery Criteria (KKM). The results show a significant improvement in student learning outcomes from the pre-cycle to cycle II. In the pre-cycle, only 40% of students achieved the KKM, while in cycle II, the percentage of students who completed the KKM increased to 85.71%. This improvement indicates that digital animation videos are effective in helping students understand and practice basic volleyball techniques, particularly in enhancing psychomotor skills. Therefore, the use of digital animation videos can serve as an effective alternative learning medium for teaching sports skills at the vocational school level.*
Keywords: *Digital animation videos, Underhand passing skills, Volleyball, Classroom action research, Learning media, Vocational school*

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INTRODUCTION

Physical education is expected to stimulate balanced development of students' attitudes, mental, social, and emotional aspects, as well as their motor skills (Tri Ayun Wulandari, 2021). Physical education aims to develop a balance among students' attitudes, mental, social, and emotional aspects, as well as their motor skills. Playing volleyball offers various benefits, including the development of good

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posture both anatomically and physiologically, as well as improvements in overall health and physical fitness. Additionally, volleyball contributes to the mental, personality, and character development of students in accordance with social norms (Tri Ayun Wulandari, 2021).

Physical education aims to develop a balance among students' attitudes, mental, social, and motor skills. Playing volleyball helps improve posture, enhance health, and support students' mental, personality, and character development in accordance with social norms (Yusmar, 2017). Each individual has different reasons for choosing to exercise, such as filling free time, pursuing recreation, achieving educational goals, or promoting personal growth. This is evident in the high enthusiasm of the community for participating in sporting events and activities. Volleyball is one of the most popular sports (Aguss et al., 2021).

According to Hidayat (2017), sports play a crucial role in human development, as they can enhance physical and spiritual well-being while fostering sportsmanship. To create intelligent and high-quality human resources, physical and spiritual well-being, and a sense of nationalism are needed, which can be achieved through sports.

Learning sports techniques, especially in volleyball, is important for developing students' skills. However, many students struggle to learn and master basic techniques, such as the underhand pass. This happens because the learning media used by teachers are limited. Conventional media, such as textbooks and blackboards, are not effective for showing movements that need clear visualization. In this case, digitally animated videos can be a good alternative to help students understand the basic underhand passing technique in volleyball.

Physical education at Jenangan Vocational School, Ponorogo Regency, has difficulties in improving students' learning outcomes for the volleyball underhand pass. This is because the teaching methods used, such as conventional methods, are not very interesting for students. Using animation-based learning media can be an effective solution to help students understand and practice the underhand pass more effectively. Therefore, this study is important to apply animation-based learning media in teaching volleyball passing at SMK Jenangan, Ponorogo Regency. It is expected that with this media, students can understand the passing technique more easily, improve their skills, and achieve better learning results.

The importance of this research is also supported by findings from a study by Yuliawan et al. (2022a), which shows that the use of learning videos can help students understand the material well and increase student activity in volleyball learning. Similarly, a study by Ansori (2023) suggests that practicing underhand passing through animated videos can significantly enhance student learning outcomes. However, most of these studies focus on elementary and junior high school students, and the results of the study by Prabowo et al. (2024), which targets 12th-grade vocational high school students, are still limited in the use of animated video media. (Yuliawan et al., 2022) This study developed a learning video for volleyball underhand passing material for fifth-grade elementary school students. This video received excellent ratings from subject matter and media experts, scoring 91% and 87%, respectively. Trials on both small and large groups demonstrated that these instructional videos were effective in enhancing students' underhand passing skills in volleyball. (Wahyu & 1(, 2024) This study tested the effect of animated videos on improving the underhand passing technique in fifth-grade students at SDN Kaliwungu 1 Jombang. The results showed a significant improvement in underhand passing technique after students used animated videos as a learning medium. Therefore, this study aims to develop digital animated video-based learning media on underhand passing in volleyball to enhance the learning outcomes of 12th-grade students.

Considering the urgency and relevance, this study is expected to make a significant contribution to improving the quality of physical education learning at SMK Jenangan, Ponorogo Regency, especially in the subject of underhand passing in volleyball. Based on preliminary observations, students' underhand passing skills in volleyball are still low. Most students are unable to perform movements according to basic techniques, such as maintaining the starting position, making proper ball contact, and coordinating their hands and feet. Skill test data indicate that 40% of students have met the Minimum Passing Criteria (KKM), while 60% have not.

The purpose of this study is to determine the effectiveness of changes in students' underhand passing skills after being provided with digital animation video learning media. Research benefits for educators: Providing an alternative effective teaching method through digital animation video media to improve

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practical skills, particularly in underhand passing in volleyball, that can be applied in the classroom learning process. For students: To improve understanding and skills in underhand passing techniques in volleyball independently and enjoyably, as well as to accelerate the learning process through more interesting and interactive media. For sports education development: Contributing to the development of technology-based learning media innovations that can be applied to sports education at the high school level and improving the quality of sports education in Indonesia. For further research: Serving as a reference for future research examining the use of animated video media in the context of teaching other sports skills and testing the effectiveness of technology-based learning media in teaching various aspects of sports at higher education levels.

(Saharulla, 2022) Volleyball is a sport played by two teams on a court separated by a net, with each team consisting of six players. The primary objective of the game is to pass the ball over the net so that it lands in the opposing team's court. (Özge Pekel, 2023) also revealed that volleyball is a sport that requires solid teamwork and practice to achieve individual goals, with a high level of excitement and enjoyment for the audience. (Arroyo et al., 2022) stated that volleyball is a team sport played by two teams, each consisting of six players, separated by a net. Each team aims to score points by hitting the ball over the net and landing it on the opposing team's court. (Rebelo et al., 2025) explain that volleyball is a sport involving multifaceted movements and high-speed actions, resulting in a variety of external training loads. (Keoliya et al., 2024) state that volleyball is a team sport that can be played by both men and women, relying on physical activities such as jumping, landing, and moving quickly. (Bilgin & Kurcan, 2024) State that volleyball is a social sport that improves motor and cognitive skills through team interaction and game strategy. Volleyball is a team sport played by two teams of six players each, on a court divided by a net.

(Farid et al., 2021) Techniques in volleyball are crucial for players to enhance their game quality. One of the basic techniques that is difficult to master is the underhand pass, a crucial movement in volleyball. (Niluh Rahayu Handayani, 2019) Underhand passing is one of the basic techniques in volleyball used to pass the ball to a teammate or receive the ball by an opponent, including when receiving a serve. The underhand pass technique depends on footwork, platform form, body position, and perceptual decision-making skills (Cruz, 2024). Developing an effective underhand pass training model for beginner athletes is evident in the results, which show that the developed training model can significantly improve the underhand pass skills of beginner athletes (Syamsuryadin, 2018). Paired passing training can improve hand-foot coordination, increase hand muscle strength and flexibility, enhance agility in receiving and passing the ball, and improve underhand passing skills in volleyball (Rahmat et al., 2018).

(Pujiani et al., 2022) Define animated videos as media that integrate visual illustrations, text, motion graphics, and synchronized narration or audio. In the context of this study, the video media used are **2D digital animated instructional videos** specifically designed to demonstrate basic underhand passing techniques in volleyball. These videos present step-by-step movements, including initial stance, arm positioning, ball contact, and follow-through, using simplified character animations, directional arrows, slow-motion segments, and brief textual cues to emphasize key technical points. Previous studies have indicated that animated videos are effective in enhancing learning motivation and skill acquisition, as they provide clear and repeatable visual representations of movement (Kleftodimos, 2024). Knapp et al. (2022) also report that animated instructional videos have a positive effect on knowledge acquisition, although their effectiveness depends on the quality of instructional design. Therefore, animated volleyball instructional videos, particularly those that systematically visualize movement phases and technical details, are an effective medium for enhancing students' understanding and execution of basic volleyball techniques, increasing learning interest, and facilitating the teaching of complex motor skills across various educational levels.

METHODS

This study employed Classroom Action Research (CAR) to enhance the underhand passing skills of 12th-grade students at SMK Jenangan, Ponorogo Regency, utilizing animated video media. Classroom action research aims to improve ongoing learning practices by taking actions that can improve student learning outcomes.

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Research Time and Place: This research was conducted over a period of two months, from July to August 2025. Place: This research was conducted at SMK Jenangan in Ponorogo Regency, specifically in Physical Education classes held during school sports lessons.

Research Target: The objective of this research is to improve student learning outcomes in basic volleyball techniques, specifically underhand passing, by utilizing animated video learning media. Learning Target: Grade XII students who take physical education classes at SMK Jenangan in Ponorogo Regency.

Research Subjects: This research involved 12th-grade students at SMK Jenangan, Ponorogo Regency, as research subjects. Number of Students: This research involved 70 students in the class that was the object of the research. The students were divided into two groups: an experimental group that received learning utilizing animated videos and a control group that used traditional learning methods.

Research Procedure

The research procedure was conducted using the Classroom Action Research (CAR) approach, which follows a cyclical process of planning, action, observation, and reflection implemented through a pre-cycle, Cycle I, and Cycle II. In the pre-cycle stage, initial observations and baseline assessments were carried out to identify students' initial abilities and learning problems related to underhand passing skills in volleyball. The results of this stage served as diagnostic data to determine the need for instructional improvement. Cycle I began with the planning stage, in which a learning plan was developed by integrating digital animated video media, along with the preparation of learning materials, observation sheets, and assessment instruments. The action stage involved implementing the learning activities using digital animated videos to demonstrate correct underhand passing techniques, followed by student practice based on the visual guidance provided. During this process, observations were conducted to record student engagement, learning activities, and performance. The reflection stage of Cycle I involved analyzing observation results and skill test outcomes to identify implementation weaknesses, such as inaccuracies in hand position and ball contact, which then informed revisions for the next Cycle. In Cycle II, the planning stage focused on improving the learning design based on reflections from Cycle I, including repeated video playback for complex movements, increased practice opportunities, and more intensive teacher feedback. The revised learning activities were then implemented in the action stage, followed by systematic observation of student performance and participation. Finally, reflection was conducted to evaluate the achievement of learning objectives and to determine that the instructional improvements using digital animated video media had effectively enhanced students' underhand passing skills.

Research Instruments

Underhand Passing Skills Test: The main instrument used is a practical test that measures students' ability to perform underhand passes in volleyball. This test will be conducted before and after the treatment to assess skill improvement. Student Response Questionnaire: A questionnaire will be administered to measure students' responses to the use of animated video media in the context of volleyball learning. Documentation will include photos and video recordings of learning activities during the research, providing further evaluation.

Data Collection Techniques

Data collection techniques in this classroom action research focused on capturing changes in the learning process and student outcomes within the same class across the pre-cycle, Cycle I, and Cycle II. Observation was conducted systematically to document student participation, engagement, and learning activities during the implementation of animated video–based instruction. Skill tests were administered in the form of a pre-test to measure students' initial underhand passing ability before the action was implemented, and post-tests at the end of each cycle to identify improvements resulting from the applied learning actions. Additionally, questionnaires were distributed to students after completing the action cycles to gather data on their perceptions and responses regarding the use of animated video media in volleyball learning. Documentation, including photographs, video recordings, lesson plans, and observation sheets, was also collected to support data validity and provide comprehensive evidence for reflection and analysis of the learning process.

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Data Analysis Techniques

Descriptive Analysis: To describe the results of the skill tests (pre-test and post-test) for both the experimental group and the control group. T-test: Used to test the difference in means between the experimental group that received learning utilizing animated videos and the control group that received traditional learning. This t-test will be used to determine whether there is a significant improvement in underhand passing skills among the two groups. Qualitative Analysis: Utilizing descriptive Analysis to analyze the results of questionnaires given to students to gain a better understanding of student responses to the use of animated videos.

RESULTS AND DISCUSSION

Results

The results of the classroom action research conducted on 12th-grade students by using underhand passing volleyball material, which utilized digital animated video media, showed an increase in learning outcomes from cycle to cycle.

Initial Conditions (Pre-Cycle)

Based on the initial observation results, the students' underhand passing skills were still low. Most students were not yet able to perform the movements according to the basic techniques, such as the starting position, ball contact, and hand and foot coordination. The skill test results data showed that only about **40%** of **students** achieved the Minimum Passing Criteria (KKM), while **60% of students** did not meet the criteria.

Cycle I

In Cycle I, learning was facilitated by digital animated videos that clearly demonstrated the steps of the underhand pass, starting from the starting position, through ball contact, to follow-up movements. The skill test results showed an improvement: the number of students who passed increased to 65%, while 35% still did not meet the MPC. Observations of student activities also showed an improvement: students were more focused, motivated, and enthusiastic when watching the animated media. However, there were still obstacles in the form of incorrect hand positions and inaccurate ball contact.

Cycle II

Based on reflections from Cycle I, the teacher refined the learning strategy by incorporating small group discussion sessions, providing direct feedback, and revisiting the animated video for the most challenging movements. The skill test results improved significantly, with 87% of students passing and only 13% failing to meet the minimum passing grade. Observations of student activities revealed that most students were able to imitate the movements correctly, demonstrated more confidence during practice, and showed good teamwork.

Comparative Analysis

By the pre-cycle to cycle I, there was a 25% increase in mastery. From cycle I to cycle II, there was a further increase of 22%. Overall, there was a 47% increase in learning mastery from the pre-cycle to cycle II.

Interpretation

This increase shows that the use of digital animated videos is effective in helping students understand the technique of passing a volleyball. This medium enables clear visualizations, captures students' attention, and facilitates gradual imitation of the movements. Thus, the use of digital animated videos can improve student learning outcomes, both in cognitive, psychomotor, and affective aspects.

Table 1. Cycle Measurement Results

Stage	Number of Students	Complete	Not Completed	Percentage
Pre-cycle	70	28	42	40
Cycle I	70	45	25	64.29
Cycle II	70	60	10	85.71

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Based on the Table of Results of the Volleyball Passing PTK, there was an increase in student learning outcomes from the pre-cycle to cycle II. In the pre-cycle, out of 70 students, only 28 (40.00%) achieved the Minimum Completion Criteria (KKM), while 42 students (60.00%) did not. This indicates that the students' basic skills in performing underhand passes in volleyball remain low.

After implementing the action in Cycle I utilize digital animated video media, there was an increase in the number of students who achieved mastery, reaching 45 students (64.29%). In comparison, 25 students (35.71%) still did not achieve the MCC. The 24.29% increase in the use of animation media suggests that it is starting to have a positive impact on students' skills. However, some students continue to experience difficulties with fundamental technical aspects.

Then, in Cycle II, after the teacher improved the learning strategy through video replays, direct feedback, and group exercises, student learning outcomes improved significantly. The number of students who passed reached 60 (85.71%), while only 10 students (14.29%) did not pass. Thus, there was a 21.42% increase in the passing rate from Cycle I to Cycle II, and a total increase of 45.71% from the pre-cycle to Cycle II.

This increase proves that the use of digital animation videos is very effective in helping students understand the technique of passing a volleyball. This medium can clearly present movements, attract students' attention, and make it easier for them to imitate and practice the basic skills of volleyball.

Discussion

The findings of this classroom action research provide strong empirical evidence that the use of digital animated video media significantly improves students' underhand passing skills in volleyball. The progressive increase in mastery—from 40% in the pre-cycle to 64.29% in Cycle I and 85.71% in Cycle II—demonstrates not only the effectiveness of the intervention but also the importance of structured, visually supported learning in physical education contexts. This improvement reflects a systematic change in students' technical understanding, motor execution, and learning engagement.

At the pre-cycle stage, students' low level of mastery indicates deficiencies in fundamental motor patterns related to underhand passing, such as stance stability, arm alignment, timing, and ball contact accuracy. This condition is consistent with Bilgin and Kurcan (2024), who argue that volleyball instruction without adequate pedagogical support often fails to address the complexity of coordinated movements required in basic techniques. Hidayat (2017) similarly emphasizes that volleyball skills demand explicit, repeated, and well-structured instruction, as learners must integrate cognitive understanding with precise motor execution. The absence of effective visual media in the initial learning process likely limited students' ability to construct accurate mental representations of the movement.

The implementation of digital animated videos in Cycle I resulted in a notable increase in learning outcomes, indicating that visual modeling played a central role in enhancing students' comprehension of underhand passing mechanics. Animated videos provide consistent, repeatable demonstrations that reduce ambiguity in movement interpretation. This finding aligns with Farid et al. (2021), who reported that technical drills emphasizing clear movement cues significantly improved underhand passing performance. Likewise, Rahmat et al. (2018) found that structured passing exercises enhanced coordination and accuracy, outcomes that are supported in this study through visual reinforcement rather than purely physical drills.

The improvement observed in Cycle II suggests a cumulative learning effect resulting from repeated exposure to animated demonstrations combined with corrective feedback and collaborative practice. This pattern is consistent with Cruz (2024), who demonstrated that repeated, focused practice significantly enhances forearm passing performance, particularly when learners can observe and correct errors. Syamsuryadin (2018) further supports this view by emphasizing that effective passing training models must facilitate progressive skill refinement through observation, repetition, and feedback. In this study, animated videos functioned as stable reference models, enabling students to self-correct and internalize correct movement patterns more effectively than through teacher demonstration alone.

From a performance-oriented perspective, the findings align with those of Tri Ayun Wulandari and Jaka Sunardi (2021), who demonstrated that the quality of instructional strategies and training media strongly influences improvements in volleyball ability among male players. Although their study focused on athletic performance rather than classroom learning, the underlying principle remains relevant: effective visualization and systematic instruction enhance technical proficiency. Arroyo et al.

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(2022) further emphasize that individual volleyball performance is shaped by technical preparedness and contextual understanding, both of which are developed through well-designed learning environments. The animated video media in this study contributed to strengthening students' technical foundations, which are essential for adapting skills to game situations.

In terms of learning media effectiveness, the results corroborate findings by Kleftodimos (2024), who concluded that animated videos are particularly effective for teaching complex procedural and motor skills due to their ability to segment movements and highlight critical phases. Knapp et al. (2022) also reported that video animations enhance procedural knowledge acquisition by reducing cognitive load and improving clarity, even though their review focused on healthcare education. The transferability of these findings to physical education is evident in this study, as students demonstrated clearer understanding and more consistent execution of underhand passing techniques.

Empirical evidence from volleyball-specific educational research further reinforces these results. Studies by Yuliawan et al. (2022a, 2022b), Wahyu and S. (2024), and Prabowo et al. (2024) consistently report that animation-based or video-assisted instruction yields higher learning outcomes compared to conventional methods. The present study extends this evidence by demonstrating that such media are not only effective at elementary or junior high school levels but also highly relevant for vocational high school students. This group has received limited attention in prior research.

Although this study did not directly assess physical conditioning or match performance, its findings are relevant to broader volleyball performance literature. Keoliya et al. (2024) and Rebelo et al. (2025) highlight that technical skill mastery is a prerequisite for effective integration of physical, tactical, and physiological components in volleyball. Improved underhand passing skills, as achieved in this study, are a foundational element that supports more advanced performance development and reduces the risk of technical errors during gameplay.

In summary, the in-depth analysis of the findings demonstrates that digital animated video media play a critical role in enhancing volleyball underhand passing skills through improved visualization, structured learning, and repeated modeling. When correlated with previous research, the results confirm that visual-based instructional media effectively bridge the gap between cognitive understanding and motor execution. This study strengthens the empirical foundation for integrating animation-based media into physical education instruction. It provides evidence of its effectiveness in improving technical learning outcomes at the vocational high school level.

CONCLUSION

Based on the results of classroom action research (CAR) involving the use of digital animation videos in teaching underhand passing in volleyball, it can be concluded that this medium is very effective in improving student learning outcomes. A significant improvement was recorded by the pre-cycle to cycle II, where student mastery increased by 40% in the pre-cycle to 85.71% in cycle II. The use of digital animation videos successfully provided clear visualizations, attracted students' attention, and made it easier for them to imitate and practice the technical movements in stages. This enabled students to better understand the basic techniques, improve their psychomotor skills, and support their cognitive and affective development.

Overall, digital animated videos proved to be an effective learning medium in helping students master the underhand passing technique in volleyball, as well as having a positive impact on a more interactive and comprehensive learning process. Therefore, the use of digital animation media can be an excellent alternative to improve the quality of sports learning, especially in fine motor skills such as the underhand passing technique in volleyball.

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