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EFFORTS TO IMPROVE FREESTYLE SWIMMING LEARNING USING AUDIO-VISUAL MEDIA

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Abstract
Freestyle swimming learning requires an integrated mastery of hand, foot, and breathing coordination, but the learning process in schools is generally still dominated by verbal explanations without media support that clarifies the movement demonstration. The initial conditions at SMA Negeri 18 Bone showed low classical completeness, namely only 30% of students achieved the Minimum Completeness Criteria (KKM) with an average grade of 69.45. This study aims to improve the learning outcomes of freestyle swimming in grade X students of SMA Negeri 18 Bone through the application of audio-visual media. The research uses a two-cycle classroom action research design; each cycle contains the stages of planning, implementation of actions, observation, and reflection. The subjects of the study were 20 students of class X. Data were collected through knowledge tests, skill assessments, attitude observations, and documentation, then analyzed in a quantitative descriptive manner based on the percentage of learning completeness. The results showed a multi-stage increase between stages: classical completeness increased from 30% (pre-action) to 45% in cycle I (average 73.30) and reached 90% in cycle II (average 88.55). In aspects, cognitive completeness increased from 40% to 80%, psychomotor from 70% to 85%, and affective from 60% to 90%. The application of audio-visual media has been shown to be effective in clarifying technical understanding, improving movement quality, and fostering positive learning attitudes. These findings imply the need to integrate engineering videos as demonstration models in school swimming learning, combined with hands-on practice and individual feedback.

Keywords: *Audio-Visual Media; Freestyle Swimming; Learning Outcomes; Classroom Action Research; Physical Education Learning*

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INTRODUCTION

Swimming occupies a dual position in the world's physical education agenda: as a safety competency and as a means of fitness. The World Health Organization report records more than 300,000 drowning deaths each year, with children and adolescents as the most vulnerable group, and places the teaching of swimming

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skills as a key prevention strategy (World Health Organization, 2024). At the same time, an analysis of 1.6 million participants from 298 population-based surveys showed that 81% of adolescents aged 11-17 years are sedentary, making school the most strategic vehicle for instilling active behavior from an early age (Guthold et al., 2020). Within that framework, learning to swim in school not only pursues technical skills, but also builds water competence that has lifelong safety implications (Stallman et al., 2017).

This urgency takes on greater weight in the Indonesian context. As an archipelagic country whose water activities are closely related to people's lives, mastering swimming here is a safety necessity, not just a curriculum achievement. The government has included swimming as a physical education material; its implementation is however faced with limitations in pool facilities, practice time, and teacher readiness (Rusda et al., 2024; Pambudi, 2025). As a result, the delivery of material is often diverted to the theoretical realm, and students are expected to master the movement without ever experiencing it completely (Arisman et al., 2022).

Field findings at SMA Negeri 18 Bone reinforce this picture. Initial observations of 20 students in class X in December 2025 obtained an average freestyle swimming learning outcome of 69.45; only 6 students (30%) achieved the Minimum Completeness Criteria (KKM) of 75, 50% were in the adequate category, and 20% were in the poor category. Interviews and observations placed difficulties at three points: coordination of hand pulls with foot kicks, breathing rhythms when heads rotate, and maintenance of body position at water level. The three difficulties are intertwined; failure to regulate breathing triggers fatigue, fatigue collapses body position, and drowning bodies make students stop trying.

The root of the problem lies in the design of learning, not in the capacity of the students. The delivery of material so far has been dominated by verbal explanations without media presenting a movement model, while the demonstration by the pool cannot be replicated simultaneously because the students practice in a short period of time. Students thus learn through trial and error in the water in a

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tiring, risky, and confidence-suppressing way. Audio-visual media offers a plausible way out: technique videos can be shown, repeated, slowed down, and analyzed with the teacher before practice, so that students bring a clear image of the movement when entering the pool (Sugiyanto, 2024; Nuraini & Mas'odi, 2024).

Empirical evidence on audio-visual media in swimming learning has actually developed, but it is spread across three unconnected pathways. The development pathway resolves the feasibility of the media but rarely tests it in real learning (Heri et al., 2021; Ramadhani et al., 2025). The experimental pathway shows a positive influence on club athletes and students (Amalia, 2023; Raswin, 2025), but hardly touches the secondary school classroom with limited facilities (Jafar & Rahman, 2026). Bibliometric studies and systematic reviews confirm this condition: interest in multimedia swimming learning is growing, but implementation studies in the real classroom are still scarce, while teacher training and device availability constraints continue to recur (Arhesa et al., 2025; Nuraini & Mas'odi, 2024). A more fundamental gap emerges in terms of measurement: the majority of research tests only one domain, knowledge or skills, so that changes in student attitudes that are actually a reference for the national curriculum escape mapping.

This research fills this gap through three contributions that were not available in previous studies. First, audio-visual media is not treated as disposable impressions, but is integrated into the classroom action research cycle so that inter-cycle reflection becomes a mechanism for refining the intensity, focus, and way of presenting media. Second, the study measures three domains of learning outcomes simultaneously cognitive, psychomotor, and affective so that the effects of media can be read in their entirety. Third, the context of the evidence presented is rarely represented in the literature: a secondary school in the eastern region of Indonesia with limited facilities, where the media is required to carry out demonstration functions that are not always available.

Taking into account these empirical needs, this study aims to improve the learning outcomes of freestyle swimming students in class X of SMA Negeri 18 Bone through the application of audio-visual media. Success is stated to be achieved

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if at least 80% of students obtain a minimum score of 75 and completeness in three domains of learning outcomes increases in stages from cycle to cycle. The questions that guide the research are formulated as follows: how can the application of audio-visual media improve the learning outcomes of freestyle swimming in class X students of SMA Negeri 18 Bone?

Physical Education Learning Outcomes in the Framework of Three Domains

The revised version of Bloom's taxonomy divides learning outcomes into a cognitive realm that is tiered from remembering to creating, a psychomotor realm that moves from imitation to movement adjustment, and an affective realm that develops from acceptance to value appreciation (Anderson & Krathwohl, 2001; Krathwohl et al., 1964). Physical Education learning places all three as one: students are seen as complete not only when they are able to explain and practice techniques, but also when they demonstrate discipline, cooperation, and responsibility during the learning process. The school assessment guidelines in this study translate that unity into 0.50 psychomotor, 0.25 cognitive, and 0.25 affective weighting weights that place mastery of movement as the core without neglecting the contribution of knowledge and attitudes. The methodological problem is that most studies on swimming learning media only measure one domain and then conclude improvements in "learning outcomes" in general; such claims become partial because changes in skills do not necessarily guarantee a change in understanding of concepts or attitudes.

Audio-Visual Media in Movement Skills Learning

Audio-visual media is a means of learning that combines sound information and image impressions simultaneously, including engineering videos, slow motion shows, two- and three-dimensional animations, student practice recordings, and interactive tutorials (Nuraini & Mas'odi, 2024). In swimming learning, five media functions become relevant: clarifying complex motion messages, providing correct motion models, saving teacher demonstration time, fostering motivation through engaging displays, and supporting independent relearning outside of class hours (Sugiyanto, 2024). These functions work not automatically, but depend on how the

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media is designed and integrated into the learning flow; long, unemphasized, and unsupervised performances have the potential to become passive spectacle.

Foundations of Theory and Comparison

Observational social learning theory. Bandura (1986) explains that new behaviors are mastered through the observation of models that work through four subfunctions: attention, retention, motor reproduction, and motivation. Engineering videos act as symbolic models that can be shown repeatedly, slowed down, and analyzed, so that students obtain motion images before practicing them. The strength of this theory lies in its ability to explain why watching models changes movement behavior, including the motivational effects of observing the success of others. Limitations, this theory lacks explain how audio-visual information is processed internally and does not establish the principles of presentation design, making it difficult for teachers to use it as a technical guide.

The theory of double encoding. Paivio (1986) assumes that information is processed through two systems of representation, verbal and nonverbal, and that they function in parallel. The combination of audio narrative and visual impressions activates both systems simultaneously, forming a stronger memory imprint than a single presentation. This theory elegantly explains why audio-visual media outperforms verbal explanations alone, but is descriptive: they are rarely translated into operational teaching principles for learning video compilers.

Cognitive theory of multimedia learning. Mayer (2021) formulated three assumptions of dual channels, limited capacity, and active processing that gave birth to applicable design principles such as segmenting (breaking the impression into short segments), signaling (highlighting crucial parts of motion), and learner control (giving the user control of playback). The strength of this theory is its action: teachers obtain concrete guidance on compiling videos. The limitation is that most of the empirical evidence comes from conceptual and declarative content, so its transfer to learning motor skills in a water environment still needs to be tested in the field.

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Cognitive load theory. Sweller et al. (2019) distinguish intrinsic, extrinsic, and germanic loads, and show that segmented and focused presentations suppress extrinsic loads so that working memory capacity is available for meaningful processing. This principle explains why short videos that focus on a single technique rather than long-form ones that load everything are more effective for beginners. The limitations are similar to Mayer's: the assumption that working memory architecture is formulated for the cognitive realm and is not necessarily equivalent when the body is moving in water.

A motor learning perspective. Fitts and Posner (1967) divide skill mastery into cognitive, associative, and autonomic stages; at the cognitive stage, students construct mental representations of movements that become the implementation template (Schmidt & Lee, 2011). Video demonstrations accelerate the formation of such templates, while recording-based feedback helps students detect errors at the associative stage. This theory most directly targets the realm of motion, but most of the research is done in laboratories and achievement sports, not in school classes with 20 students, limited time, and one pool.

Table 1. Comparison and synthesis.

Theory	Explanatory focus	Strength	Limitations	Contributions to research
Social learning (Bandura, 1986)	Behavioural change through model observation	Explain the mechanisms of imitation and motivation	Not establishing media design principles	Justifying video as a motion model
Double encoding (Paivio, 1986)	Processing of two verbal-nonverbal channels	Explain the advantages of audio-visual combinations	Descriptive, less operational	Justify the integration of narratives and impressions
Multimedia (Mayer, 2021)	Effective presentation design	Prinsip konkret: segmenting, signaling, learner control	Dominant evidence on conceptual content	Be a guide to segmentation and highlighting techniques
Beban kognitif (Sweller et al., 2019)	Working memory capacity	Describe the effectiveness of focused short impressions	Not yet equivalent for moving conditions	Being the basis for selecting a segment of one technique
Motorik (Fitts & Posner, 1967; Schmidt & Lee, 2011)	Stages of skill mastery	Explain the role of mental representation and feedback	Research generally outside of the school classroom	Be the basis for media placement before and after practice

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None of the above theories are singularly adequate. Bandura and Paivio explain why media works, Mayer and Sweller explain how media should be designed, while motor theory explains when media plays the most role in the skill mastery stage. This research framework brings together the five: technique videos are segmented by movement components, shown before practice to form mental representations, and selectively repeated during reflection for error correction.

Empirical Evidence of Video Media in Learning

A systematic review by Noetel et al. (2021) of 105 experimental studies concluded that video improved learning outcomes compared to no intervention and functioned on par with face-to-face teaching, with an effect that was amplified when video was combined with active learning activities. These findings provide a solid foundation, while confirming that video is not a substitute for teaching, but rather a component that must be integrated into practice.

In the swimming realm, the available evidence shows a consistent but scattered direction. Raswin (2025) reported a 51.80% increase in knowledge and 31.55% in skills through audio-visual-based media; Amalia (2023) found a significant influence on freestyle learning of club athletes; and Ramadhani et al. (2025) developed breaststroke swimming audio-visual media through the ADDIE model which was declared to be very feasible with a statistically significant increase in knowledge and skills. The development path completes the picture: crawl technique tutorial videos (Heri et al., 2021), basic swimming learning videos (Imansyah et al., 2022), and underwater videos (Suwiwa, 2022) were all tested for feasibility and were able to clarify technical understanding. A bibliometric study by Arhesa et al. (2025) shows a growing trend of multimedia use in swimming learning, but specific studies in the school classroom are still limited, while a systematic review by Nuraini and Mas'odi (2024) noted an increase in student motivation and engagement in addition to teacher training constraints and device availability (Suradi & Abdullah, 2025).

Critically read, the overall evidence places audio-visual media as a promising intervention, but three repeats of the pattern emerge: measurements tend to cover

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one domain, subjects are generally athletes or college students, and developmental design is rarely followed by practical classroom application tests. This pattern is the entry point of this study.

METHOD

Research Design

This study uses a classroom action research (PTK) design with the Kemmis and McTaggart spiral model that moves through planning, action, observation, and reflection in repetitive cycles (Kemmis et al., 2014). PTK was chosen because the problem studied is contextual about the limitations of media in swimming learning in a particular class so that the solution must be formulated, tested, and refined directly in real learning situations, not through group comparisons. The research was designed in two cycles that were carried out collaboratively between researchers and teachers of physical education subjects; intercycle reflection became a mechanism for adjusting the intensity of media playback, demonstration focus, and portion of individual guidance. This design is also flexible: additional cycles are prepared if success indicators have not been achieved in cycle II, even though these conditions do not occur in the implementation.

Location and Time

The research was carried out at SMA Negeri 18 Bone, China District, Tanete Harapan Village, Bone Regency, South Sulawesi, with swimming practices in the school's partner swimming pools. The initial observation was carried out in December 2025, cycle I took place on June 15-16, 2026, and cycle II on June 18-19, 2026 in the 2025/2026 school year. Each meeting was allocated 2 × 45 minutes so that a total of four learning meetings were scheduled in two cycles.

Population, Sample, and Sampling Techniques

The research population is all students of class X of SMA Negeri 18 Bone for the 2025/2026 school year. The sample was purposively determined in one whole class, namely class X.E3 which consisted of 20 students (8 males, 12 females), with the consideration of the results of the initial observation placing the class in the most obvious condition of the problem: an average of 69.45 and classical

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completeness of 30%. In PTK, the class is positioned as a unit of action as well as an analysis unit, so that all class members are included without the withdrawal of a sub-sample a kind of total sampling in one learning unit. The absence of students at a particular meeting does not exclude them from the analysis; the score is taken at the evaluation opportunity available in the same cycle.

Research Procedure

The implementation follows five continuous stages. First, the pre-action stage includes initial observation, interviews with teachers and students, and measurement of initial conditions as a baseline. Second, the planning stage of each cycle includes the preparation of lesson plans that integrate audio-visual media, the preparation of learning videos of basic freestyle swimming techniques (sliding positions, leg movements, hand movements, breathing, and coordination), as well as the preparation of observation and assessment instruments. Third, the action stage contains four meetings: in cycle I, the first meeting delivers material with the demonstration method and the second meeting shows technique videos as the main medium followed by movement practice; in cycle II, the third meeting strengthens the demonstration and movement practice in the classroom with individual guidance, and the fourth meeting carries out field practice in the pool as well as a skill test. Fourth, the observation stage is carried out by researchers and teachers in parallel using observation sheets during the process. Fifth, the reflection stage analyzes the results of observation and evaluation to determine improvements in the next cycle; The research was stopped in cycle II because the success indicators had been achieved.

Research Instruments

Data was collected through four main instruments covering the three domains of learning outcomes and learning processes.

Table 2. Summary of Research Instruments

Instruments	Objectives	Shape	Indicators/Items	Scale
Knowledge test	Cognitive	Description	Basic freestyle swimming concepts and techniques	Headline Penskoran 0–100

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Skills rubric	Psychomotoric	Practice tests	Hand pull; leg kick; breathing; movement coordination; travel speed 15 m	1–4 per component (max. 20)
Attitude observation sheet	Affective	Observations	Discipline; responsibility; cooperation; confidence	1–4 per aspect
Activity observation sheet	Learning process	Observations	focus; liveliness; accuracy of imitating models; response to feedback; cooperation; enthusiasm	1–4 per aspect
Documentation	Supporters	Photos, videos, attendance, lesson plans, grade recaps	Validity of the action process	-

The skill rubric was developed referring to the indicators of basic freestyle swimming techniques that have been used in similar studies (Fauzi et al., 2023), while the attitude and activity observation sheets were adapted from media-based physical education learning instruments (Farel & Candra, 2024). The interpretation categories of activity percentages followed standard gradations: 81–100% (very good), 61–80% (good), 41–60% (adequate), and 21–40% (poor).

Validity and Reliability

The validity of the content was obtained through expert review: all instruments were checked by the school Physical Education teacher and reviewed with the supervisor to ensure the suitability of the items with the learning outcomes of freestyle swimming material; items that were considered unrepresentative were revised before use. The reliability of the observation instrument was tested through an inter-rater reliability agreement between the researcher and the Physical Education teacher who observed in parallel, calculated by the percentage of agreement:

PA = (number of agreed points / total number of all observed points) × 100%

The instrument is declared reliable when the percentage of agreement reaches 80% or more; the observation results in both cycles are above that threshold. The validity of the overall data is strengthened by triangulation techniques the cross-referencing of test, observation, and documentation results and the triangulation of

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sources through a comparison of the assessments of two observers at the same observation moment.

Data Collection Techniques

Cognitive data was obtained from a description test at the end of each cycle; psychomotor data was obtained through a freestyle swimming practice test that assessed five components of the technique; affective data was collected through attitude observation during learning; and process data was recorded through student and teacher activity observation sheets. Documentation in the form of photos, learning videos, attendance lists, and score recaps became evidence of the implementation of actions as well as verification data.

Data Analysis

The analysis uses a quantitative descriptive approach in three steps. The value of each component is calculated by the conversion of the score:

Value = (acquisition score / maximum score) × 100

The final grades of each student are compiled based on the weighting of the school curriculum:

Final score = (0.50 × Psychomotor) + (0.25 × Cognitive) + (0.25 × Affective)

Individual completeness is set at a value of ≥ 75 according to the MOH, and classical completeness is calculated by:

P = (f/N) × 100%

with f = the number of students completed and N = the number of students. The qualitative data from the reflection notes were analyzed through reduction, presentation, and conclusion drawing to complete intercyclical improvements. The research was declared successful if: (1) at least 80% of students achieved a score of ≥ 75; (2) the activities of students and teachers were in the good or excellent category (≥ 80%); and (3) learning outcomes increased in stages from the initial condition, cycle I, to cycle II.

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RESULTS

Early Learning Conditions (Pre-Action)

Baseline measurements before action involved all 20 students with no missing data. The grade average was 69.45 with a score range of 59–79; only 6 students (30%) achieved KKM 75, while 14 students (70%) were incomplete. Recalculated from individual data, completeness per domain showed cognitive 7 students (35%), psychomotor 7 students (35%), and affective 9 students (45%) patterns that placed the domain of knowledge and skills as the weakest points before the intervention.

Table 3. Descriptive Statistics of Inter-Stage Freestyle Swimming Learning Outcomes

Stages	n	Average	SD	Range	Complete, n (%)
Pre-Actions	20	69,45	6,30	59–79	6 (30)
Cycle I	20	73,30	4,64	63–80	9 (45)
Cycle II	20	80,50	4,84	71–89	18 (90)

Cycle I Process and Results

Cycle I was held in two meetings (15–16 June 2026). The first meeting delivered material through the demonstration method; the second meeting showed a video of freestyle swimming techniques as the main medium, followed by movement practice according to visual examples. The results of the observation of the process recorded high enthusiasm when the video was shown and active involvement in practice, but some students were still passive in asking questions and repeating mistakes in hand-foot coordination, breathing rhythm, and body position maintenance.

The end-of-cycle evaluation showed uneven improvement between domains: psychomotor completeness reached 70%, far above affective (60%) and cognitive (40%) completeness. The average class increased to 73.30, but classical completeness of 45% was still below the 80% success indicator, so the research continued to cycle II.

Cycle II Process and Results

Cycle II took place on June 18–19, 2026 with two adjustments based on the reflections of cycle I: video shows were rebroadcast with an emphasis on difficult technical parts, and teacher demonstrations were combined with individual

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guidance and correction. The third meeting focused on demonstrations and movement practices in the classroom; the fourth meeting carried out hands-on practice in the pool as well as a skill test. Process observation showed an increase in students' activeness asking more questions, imitating movements more precisely, and appearing more confident during practice in the pool accompanied by improvements in movement coordination, breathing regularity, and body position balance.

The results of the evaluation of cycle II reached the threshold of success in all domains: cognitive 80%, psychomotor 85%, and affective 90%. Classical completeness penetrated 90% with 18 out of 20 students completing it; the remaining two students obtained final scores of 74 and 71, and both were below KKM in the psychomotor domain (score 69). The research was stopped in cycle II.

Completeness per Learning Outcome Domain

Table 4. Completeness and Average Score per Domain of Learning Outcomes

Domain	Preaction n (%) / M	Cycle I n (%/M	Cycle II n (%/M
Cognitive	7 (35) / 67,95	8 (40) / 72,60	16 (80) / 79,35
Psychomotoric	7 (35) / 70,45	14 (70) / 74,65	17 (85) / 80,70
Affective	9 (45) / 69,25	12 (60) / 71,60	18 (90) / 82,50

Table 3 shows two patterns. First, the largest spike in completeness occurred from cycle I to cycle II in the cognitive realm (+40 percentage points), while psychomotor actually reached the highest completeness earlier (70% in cycle I). Second, in the average score, the affective realm recorded the highest increase between stages (+13.25 points from pre-action to cycle II), followed by cognitive (+11.40) and psychomotor (+10.25).

Incremental Upgrades

Table 5. Summary of Inter-Stage Learning Outcomes Improvement

Indicator	Pre → Cycle I	Cycles I → II	Pra → Siklus II
Classical completeness (percentage points)	+15	+45	+60
Grade point average	+3,85	+7,20	+11,05

Overall N-gain was 0.36 (moderate category); per domain, affective N-gain 0.43, cognitive 0.36, and psychomotor 0.35. The distribution of grades narrowed throughout the stages (SD 6.30 → 4.64 → 4.84), indicating improvements that reached the majority of students and were not concentrated in the upper ability group.

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DISCUSSION

Why Audio-Visual Media Works

The improvement in learning outcomes in this study cannot be explained only by the presence of video impressions, but by the chain of cognitive mechanisms activated by them. Segmented technique videos present motion information through visual and verbal channels simultaneously, so that students form a more complete mental representation than when receiving verbal explanations alone (Paivio, 1986; Mayer, 2021). At the cognitive stage of motor skill mastery, this mental representation becomes the template for movement implementation; without a template, students move by trial and error in the water (Fitts & Posner, 1967; Schmidt & Lee, 2011). Field findings consistent with this pathway are improvements in motion sequences and reduction in coordination errors after videos are shown before practice.

The second factor comes from the presentation design, not the medium. The segmentation of impressions per motion component keeps the processing load within the range of the beginner's working memory (Sweller et al., 2019), and the ability to replay gives students control of learning two conditions that Mayer (2021) stated to be determinants of multimedia effectiveness. The decline in performance in cycle I provides a useful contrast: when the media is only shown once without individual emphasis and guidance, mastery has not yet been established. This means that the active ingredient is not "there is a video", but rather a "video that is designed, selectively repeated, and integrated with feedback" in line with the findings of Noetel et al. (2021) that the effect of video amplifies when combined with active learning activities.

The third factor is structural: the classroom action research reflection cycle serves as a refinement mechanism that is not available in the one-way intervention design. Adjustments in cycle II of emphasis on difficult segments, intensity of individual tutoring, and a larger portion of practice directly address the weaknesses diagnosed in cycle I. Thus, differences in outcomes between cycles show that media impacts are cumulative through teaching calibration, rather than instantaneous.

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Interdomain Patterns and Equity Issues

The results of cycle I, which were psychomotor imbalanced far above cognitive, confirmed that the effects of audio-visual media were differentiated between domains and were not synchronized in time. Movement skills were most quickly encouraged because video accelerated the formation of movement templates; attitudes were strengthened due to engaging impressions and practical experiences that succeeded in fostering self-efficacy (Bandura, 1986); while conceptual understanding required deeper processing, which in cycle I had not been facilitated. The jump in cognitive completeness in cycle II (+40 percentage points) only occurred after the video was played back with conceptual emphasis and reinforced by the teacher's explanation that impressions without verbal reinforcement tended to produce superficial understanding. This pattern reinforces the methodological criticism raised in the literature review section: claims of increased "learning outcomes" measured from one domain alone risk hiding inequality between domains.

The problem that should not be forgotten is the two students who remain incomplete in cycle II (scores 74 and 71), both of which are held back in the psychomotor domain. This failure indicates an obstacle that the media is not adequately addressed: minimal initial motor experience, confidence in water, or insufficient amount of practice for students with different learning speeds. Classical completeness of 90% is not a stopping point but rather a signal of the need for differentiated instruction of additional exercise modules, peer tutoring, or individual improvement sessions because the same medium can produce different learning rates between individuals. Hiding a small part of failure behind the class average will undermine the claim of success of the action itself.

Theoretical Implications

The findings of the study contribute three things to the theoretical level. First, the evidence for the effectiveness of multimedia so far has been dominated by conceptual and declarative content (Mayer, 2021; Noetel et al., 2021); This study extends the evidence to motor skills in water environments in a real classroom

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setting, showing that the principles of segmentation and emphasis also work in the realm of motion. Second, the differentiation of effects between the fastest, lateest psychomotor domains provides empirical support for the thesis that the three domains of learning outcomes respond to media interventions at different rates, so the framework of the three domains needs to be read as a layered process, not a simultaneous achievement. Third, the reflection cycle is proven to be an active variable that determines the magnitude of the effect; this shifts the understanding of "media as a device" towards "media as a calibrated practice", a view that is in line with Bandura's (1986) observational learning framework that places motivation and reinforcement as a condition for behavioral reproduction, rather than just model exposure.

Practical Implications

For Physical Education teachers, these findings can be translated into inexpensive and replicable operational protocols: (1) showing segmented technique videos before practice to form a representation of motion; (2) re-demonstrating crucial passages in person; (3) facilitating guided practice with individual corrections; (4) replaying difficult segments during reflection; and (5) closing with practice tests in the next session. The entire stage only requires a projector, a player device, and a video that can be compiled from open source or the condition teacher's recordings available in the majority of schools. The media also serves as a compensator for the pool's time limitations: dry practice in the classroom with the video model saves hours of water for exercises that actually require water. For students who have not yet completed, portions of individual feedback and differentiation exercises need to be increased, given the findings that the effect of media is uneven on all learning profiles.

Policy Implications

At the policy level, the results of the research provide three goals. First, the digital literacy training program for Physical Education teachers needs to be directed at the technical-pedagogical competence of selecting, editing, and integrating videos into the lesson plan because of the repeated teacher readiness

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constraints in various studies (Nuraini & Mas'odi, 2024; Arhesa et al., 2025). Second, investment in learning facilities (projectors, stable electrical connections, and recording devices for video-based feedback) should be prioritized considering the relatively low cost compared to the impact on learning completion. Third, curriculum policies that have required three-domain assessments should be supported by guidelines on media presentation techniques per domain, because research findings show that without different reinforcement strategies per domain, the cognitive domain has the potential to lag behind even if media has been used. This last implication is also relevant for ensuring the quality of learning to swim as a life safety competency, as emphasized in the global health agenda (World Health Organization, 2024).

CONCLUSION

The application of audio-visual media has been proven to improve the learning outcomes of freestyle swimming in grade X students of SMA Negeri 18 Bone, so that the research objectives were fully achieved. Classical completeness increased in stages from 30% in pre-action to 45% in cycle I and 90% in cycle II, with the class average increasing from 69.45 to 80.50 (N-gain 0.36, medium category). In a separate domain, cognitive completeness increased from 40% to 80%, psychomotor from 70% to 85%, and affective from 60% to 90% all exceeded the success indicator ≥ 80% in cycle II. The effect was not born from the impression alone, but from the integration of segmented technique videos with teacher demonstrations, guided practice, individual feedback, and intercyclical teaching calibration; two students who have not completed the second cycle are still stuck in the psychomotor realm and require different handling.

The contribution of the research is threefold. Theoretically, the study extends the evidence of multimedia effectiveness from conceptual content to motor skills in a real classroom setting and shows that the three domains of learning outcomes respond to interventions at different rates. Methodologically, the study links validated media to the measurement of three domains as well as practices that have rarely been done in the study of swimming learning media. Practically, the study

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produced a protocol for the application of cheap and replicable audio-visual media for Physical Education teachers in schools with limited facilities.

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