Vol. 13 No. 2 September 2026
e-ISSN: 2807-2227
p-ISSN: 2355-4355

The Influence of Audio-Visual Media on Chest Pass Ability on Basketball Learning of Senior High School Grade X Students

Restu Andhika Firdaus[1], Rahmat Iqbal[2], Dhika Bayu Mahardika[3]
Pendidikan Jasmani Kesehatan dan Rekreasi, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Singaperbangsa Karawang, Jawa Barat, Indonesia

Authors Email: 2210631070098@student.unsika.ac.id, rahmat.iqbal@staff.unsika.ac.id, dhika.bayumahardhika@fkip.unsika.ac.id

Correspondent Author: 2210631070098@student.unsika.ac.id

Received: June 20, 2026; Accepted: August 20, 2026; Published: September 30, 2026
Ed: 2026: 575-590

Abstract

Audiovisual demonstrations may support motor-skill instruction, but evidence specific to chest-pass technique in regular senior high school physical education remains context-dependent. This study examined changes in chest-pass performance following audiovisual-assisted basketball instruction among Grade X students. A quantitative pre-experimental one-group pretest–posttest design was employed with 35 students from class X-2 at SMAN 1 Cibitung, selected through purposive sampling. Students completed a performance-based chest-pass assessment before and after instruction, covering initial stance, movement execution, and follow-through; component scores were combined into a total score. Descriptive statistics and the two-sided Wilcoxon signed-rank test were used to compare paired measurements, and rank-biserial correlation was reported as an effect-size indicator. The mean total score increased from 7.371 (SD = 1.864) at pretest to 9.171 (SD = 1.581) at posttest, representing a mean difference of 1.800 points. The paired comparison indicated a statistically significant difference ($W = 5$, $z = -4.843$, $p < .001$), with a rank-biserial correlation of −0.981 when differences were defined as pretest minus posttest. Improvements were also observed descriptively in all three movement components. These findings document positive changes in assessed chest-pass technique during the instructional period and suggest that audiovisual demonstrations may be a useful teaching resource alongside guided practice. However, the absence of a control group prevents attributing the changes specifically to audiovisual media, and the assessment does not establish passing accuracy, skill retention, or transfer to gameplay.

Keywords: audiovisual instruction; basketball; chest pass; motor skill assessment; physical education.

INTRODUCTION

Physical Education, Sports, and Health (PJOK) provides students with the opportunity to develop movement skills through a learning process that integrates observation, practice, and feedback. In basketball, passing skills play an important role in maintaining ball possession and connecting individual actions in team play. One basic technique that needs to be mastered is the chest pass, which is a pass from the front of the chest that requires coordination of initial posture, body and arm movements when releasing the ball, as well as the final attitude (follow-through). These three components are indicators that can be observed in assessing technique implementation, although movement quality does not always reflect the accuracy of the pass or the success of the game. The learning challenge lies in the teacher's ability to help students understand the sequence of movements and apply them consistently. Research on observational learning shows that observation of movement models can support the acquisition of motor skills, while the benefits of various forms of visual presentation depend on the characteristics of the task and learning conditions (Han et al., 2022; Sorgente et al., 2022). The combination of observation and hands-on practice can also provide complementary learning experiences (Bazzini et al., 2022).

Students experience difficulties in performing the chest pass technique, especially in movement coordination, ball direction, and accuracy of technique execution. This condition indicates

learning problems that require attention but cannot yet be treated as quantitative findings because they are not accompanied by information on error frequency or validated ability classification. Difficulty coordinating initial posture, movement execution, and final posture potentially hinders mastery of chest passing techniques during basketball lessons. Delivering material that relies solely on verbal explanations also potentially limits students' opportunities to observe the relationships between movement stages. Therefore, a learning approach that allows students to obtain clearer representations of movements is needed. Audiovisual media can be a supporting alternative because it allows for dynamic and repeated presentation of technique demonstrations. However, the use of these media cannot be considered the sole determining factor for learning success because students' skills also develop through practice, movement repetition, and teacher feedback.

Empirically, motor skills learning through observation has received support from various studies, although the characteristics of tasks and participants used differ. Han et al. (2022), through a systematic review in the context of physical education, found support for observational learning compared to conditions without observation of movement models, but the additional benefits of verbal instruction have not shown consistency. Bazzini et al. (2022) examined the combination of action observation and movement execution in motor skills acquisition, while Ashraf et al. (2023) investigated the relationship between various modeling methods and skill acquisition and retention. Sorgente et al. (2022) compared the use of visual instruction oriented towards technique and movement goals in children's motor learning skills. Overall, the study demonstrated the importance of matching visual information with skill characteristics and opportunities to practice. However, these findings have not proven that all forms of video-assisted learning produce the same skill changes.

The use of video in sports learning also demonstrates diverse pedagogical functions. Souissi et al. (2021) evaluated the use of video feedback combined with learning activities in weightlifting techniques, while San et al. (2022) examined interaction and evaluation among participants through structured video feedback. Bouzid et al. (2025) studied the use of video feedback in learning acrobatic gymnastics skills. The study demonstrated the potential for integrating visual information, practice, and feedback in learning movement skills. However, the use of participant performance recordings as evaluation material differed from the presentation of technique demonstrations before practice. Differences in intervention characteristics and skill types meant that findings from other sports branches could not be directly generalized in basketball chest pass technique learning.

In the context of basketball, Tannoubi et al. (2023) reported that the use of video modeling is related to better passing test performance in beginner players through quasi-experimental research. Rekik et al. (2021, 2023) examined tactical action basketball learning using dynamic and static visual representations, with a primary focus on the form of information presentation. Rezaei et al. (2023) examined attention focus strategies during basketball free throw skill modeling, while Aydogan and Demirok (2023) examined video-assisted basic basketball movement learning for students with Down syndrome. These findings reinforce the relevance of using visual demonstrations in basketball learning. However, differences in participant characteristics, intervention forms, and outcome constructs indicate that previous research has not fully matched the quality assessment of chest *pass* technique implementation in regular high school PJOK learning.

Research in Indonesia shows that *chest pass* skills have been studied through various learning approaches. Safitri et al. (2022) directly studied the use of audiovisual media on chest pass skills among junior high school basketball extracurricular participants. Soederajat et al. (2022) examined the application of drill training methods on basic *chest pass* skills of high school extracurricular

students, while Hasyim et al. (2025) developed game-based chest pass learning. The study emphasized that the use of audiovisual media and chest pass skills is not entirely new topics. In a broader context, Li and Liu (2026) examined basketball learning through a blended learning approach that integrates several instructional components, while Greve et al. (2022) examined the use of digital media in soccer game learning. Fazeli et al. (2025) also showed that changes in movement coordination are not always accompanied by comparable changes in accuracy or movement control. Thus, learning evaluation needs to distinguish the quality of technique implementation from indicators of success in other skills.

Based on the synthesis of previous research, there are three underlying gaps in this study. First, the outcome-construct gap, which is the difference between research assessing general passing performance, tactical actions, or game involvement and research specifically evaluating the implementation components of the chest pass technique**.** Second, the instructional-context gap, which is the difference in characteristics between research on sports clubs or extracurricular activities and regular PJOK learning for 10th-grade high school students. Third, the evidence-integration gap, which is the inconsistent distinction between video modeling, video feedback, and blended learning when explaining changes in motor skills. This study attempts to address this gap through measuring chest pass technique skills before and after basketball learning assisted by audiovisual media in the context of school learning. However, this approach is not designed to isolate the specific contribution of audiovisual media from other learning components.

The empirical novelty of this research lies in the study of changes in the skills in implementing the chest pass technique after basketball learning assisted by audiovisual media in the context of regular PJOK for 10th grade high school students, with measurements focusing on movement components. The study involved 35 students of class X-2 at SMAN 1 Cibitung using a quantitative approach with a pre-experimental design of one-group pretest–posttest. Chest pass skills were assessed based on initial attitude, movement implementation, final attitude, and overall skill scores. This study aims to analyze the differences in chest pass skill scores between measurements before and after learning among the same participants. The research hypothesis states that there is a difference in chest pass skill scores between the pretest and posttest. Because no control group was used, the observed changes cannot be attributed exclusively to the use of audiovisual media, but can also be related to practical experience, teacher feedback, and measurement repetition. Therefore, the research contribution is placed as initial empirical evidence relevant to the development of basic basketball technique learning, not as proof of causal superiority of audiovisual media, long-term skill retention, or skill transfer in game situations.

METHOD

Research Design and Location

This study uses a quantitative approach with *a one-group pretest–posttest* pre-experimental design to analyze changes in students' chest pass skill scores before and after basketball learning assisted by audiovisual media. The research was conducted in the context of Physical Education, Sports, and Health (PJOK) learning at SMAN 1 Cibitung. The research design is expressed in the notation O_1-X-O_2, with O_1 indicating the initial measurement of *chest pass skills*, X representing the learning series assisted by audiovisual media, and O_2 indicating the final measurement in the same participants. The use of repeated measurement designs allows each participant's skill changes to be analyzed in pairs. However, the absence of control groups and randomization limits the study's ability

to isolate audiovisual media contributions from repetitive exercises, teacher feedback, previous experiences, and test repeat effects. Thus, the study is directed to evaluate changes in skill performance, rather than to test the causal superiority of audiovisual learning over other learning approaches.

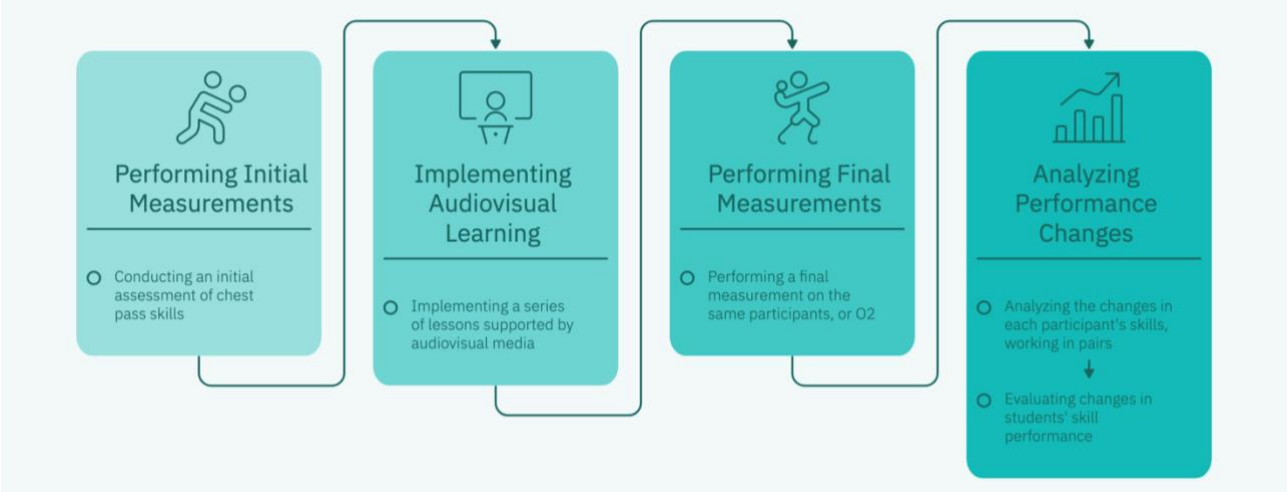


Figure 1. Chest pass skills research design

This design selection needs to be distinguished from the research by Tannoubi et al. (2023), which used a quasi-experimental approach with comparison groups to evaluate *video modeling* on 20 beginner basketball players. Ghorbel et al. (2026) also used comparison groups to evaluate physical education learning assisted by video. Both studies demonstrate the importance of design alignment with the inferential strength to be produced. This study has a more limited inference scope because it only involves one measurement group.

Participants and Sampling Techniques

The research population includes all tenth-grade students at SMAN 1 Cibitung who participate in PJOK learning. The research sample consists of 35 students from class X-2, determined using *purposive sampling* technique. The considerations for selecting samples are participation in basketball learning and the need to improve chest pass skills based on initial observation results. All participants had complete data from *the pretest* and *posttest* measurements, so 35 pairs of scores could be used in the analysis. There was no missing data in the eight measurement variables reported in the statistical table. However, the completeness of test scores cannot be used as evidence that all participants attended every learning session.

Learning Materials and Empirical Foundations of Intervention

Learning focused on mastering *the chest pass* technique through audiovisual demonstrations related to initial *stance*, *movement execution*, and final attitude (*follow-through*). These three components were used as the basis for aligning the learning material with the skill test indicators. The use of audiovisual demonstrations received empirical support from Tannoubi et al. (2023), who evaluated a *video modeling* program over four weeks on beginner basketball players. The study included video observation before training sessions and reported better passing test performance in the video modeling group compared to the control group. Rekik et al. (2021) also showed that the type of visual representation is related to learning basketball tactical actions in high school students. However, the types of skills and instruments in this study were not entirely equivalent to the chest pass technique assessment in this study.

Learning organization linking demonstration with movement practice is also supported by Bazzini et al. (2022), who found that the combination of observation and action implementation results in greater improvements in motor learning performance compared to using observation or practice strategies separately. Souissi et al. (2021) demonstrated the benefits of combining video feedback and pedagogical activities in sports technique learning, while San et al. (2022) identified differences in interaction characteristics and feedback quality based on video-assisted evaluation forms. These studies form the basis for developing the intervention framework, but do not prove that the same form of feedback or training dose has been used in this study. Two audiovisual sources proposed for the reconstruction of the learning materials are: Video 1: https://youtu.be/vfAtCyRtYW4, Video 2: https://youtu.be/LTpfHmj9YgI.

Chest Pass Learning Program

The initial manuscript states that learning takes place over eight meetings. To improve the repeatability of intervention reporting, learning focus, objectives, achievement indicators, and practical activities are systematically arranged as shown in Table 1.

Table 1. Eight-session audiovisual-assisted chest pass learning program

Learning Focus	Learning Objectives	Achievement Indicators	Learning Activities and Practice
Introduction to the chest pass technique	Students understand the fundamental principles and movement phases of the chest pass.	Students can identify the three movement phases and demonstrate the basic chest pass technique.	Watching instructional videos, technical explanations, teacher demonstrations, and paired passing drills.
Initial stance	Students demonstrate the correct body position before executing a chest pass.	Students can demonstrate appropriate foot positioning, body balance, and ball grip.	Reviewing instructional videos and practicing the initial stance with corrective feedback from the teacher.
Movement execution	Students coordinate body and arm movements when performing a chest pass.	Students can demonstrate coordinated arm extension, weight transfer, and accurate ball release.	Watching technical demonstrations and performing paired passing drills with teacher feedback.
Final stance (*follow-through*)	Students demonstrate the correct follow-through after releasing the ball.	Students can perform appropriate arm extension and wrist movements during the follow-through phase.	Watching instructional videos and practicing follow-through movements repeatedly.
Integration of chest pass techniques	Students integrate the three movement phases into a coordinated chest pass.	Students can perform the initial stance, movement execution, and follow-through in the correct sequence.	Reviewing complete chest pass demonstrations and performing integrated technique drills with corrective feedback.
Technique reinforcement and passing accuracy	Students maintain proper technique while directing passes toward a target.	Students can execute chest passes toward a partner or designated target using appropriate technique.	Reviewing instructional videos, practicing target-directed passing, and correcting technical errors.
Skill application	Students apply chest pass techniques during small-group activities.	Students can perform chest passes with proper movement sequences during group practice.	Small-group passing drills, modified game simulations, and teacher feedback.
Final reinforcement and evaluation	Students demonstrate the complete chest pass technique.	Students can perform all three movement components according to the established skill assessment indicators.	Reviewing audiovisual materials, performing integrated technique drills, conducting formative evaluations, and reinforcing key technical elements.

The learning program is progressively designed from the introduction of techniques, strengthening movement components, skill integration, to application in practical activities. This

sequence is used to illustrate the pedagogical relationship between the learning material and the skills components assessed.

Data Collection Procedure

Data collection included three stages: initial measurement, learning implementation, and final measurement. In the first stage, participants took the pretest of chest pass skills using assessment instruments covering initial attitude, movement execution, and final posture. Each participant received scores for all three components and one total skill score. The second stage was the implementation of a series of learning sessions assisted by audiovisual media. The learning process included technique demonstrations as observation material related to chest pass practice activities. According to the research design, all intervention activities took place after the pretest and before the posttest. The actual procedures included video presentation, exercises, teacher demonstrations, and feedback. The third stage involved conducting a posttest using the same instrument. The data from the second measurement were then matched using consistent participant identities. Equivalence of measurement conditions included location, passing distance, number of opportunities, examiner instructions, and scoring procedures.

Chest Pass Skill Assessment Instrument

The research instrument was a performance-based skill assessment that assessed the quality of chest pass technique implementation. The instrument included three observation components: initial attitude, movement execution, and final attitude. The assessment of each component produced scores which were then summed into the total skill score. Operationally, the total participant score was calculated by adding the scores of the three components at the same measurement time.

Table 2. Operationalization of Chest Pass Skill Measurement

Component	Operational Focus	Observed Score Range	Measurement Role
Initial stance	Foot positioning, body balance, and ball grip before passing.	1–4	Secondary outcome
Movement execution	Coordination of body movement, arm extension, and ball release.	1–4	Secondary outcome
Follow-through	Arm and wrist movement after ball release.	1–4	Secondary outcome
Total chest pass score	Sum of the three assessed components.	4–10 at pretest; 6–12 at posttest	Primary outcome

Note: The displayed ranges represent observed values in the supplied statistical results. The theoretical minimum and maximum of the original rubric must be confirmed separately.

The quality assessment of technique through several observation components aligns with Bouzid et al. (2025), who use observation grids and joint angle analysis to evaluate movement skills in acrobatic gymnastics learning. However, the study did not validate the chest pass instrument used in this study. Fazeli et al. (2025) also showed the importance of distinguishing aspects of coordination, accuracy, and movement control in observational learning. Therefore, the technique score in this study is not automatically considered a measure of passing accuracy or game success if these indicators are not specifically assessed.

Data Analysis

Data were analyzed using descriptive and inferential statistics on 35 pretest–posttest score pairs. Descriptive statistics included mean, standard deviation, minimum, maximum, and percentage change in scores. Analysis was conducted on three components: chest pass skills and total scores. Data normality was checked using the Shapiro–Wilk test. Paired score differences were analyzed

using a two-tailed Wilcoxon signed-rank test at a significance level of $\alpha = 0.05$, with differences calculated as pretest-posttest. Results were reported using W, z-value, and p statistics, considering zero-difference scores and equal ranks (ties). The magnitude of change was analyzed using rank-biserial correlation (rrb) along with a 95% confidence interval. Additional analysis used normalized gain (N-Gain). N-Gain results were presented through mean, median, standard deviation, value range, and Shapiro–Wilk test. Score changes were visualized using a pretest–posttest comparison graph. All analyses used a significance level of 0.05, with a $p < 0.001$ reported according to statistical rules. The theoretical maximum score, Wilcoxon p-calculation method, and software version need to be verified from the original analysis documents.

RESULTS

This study aims to analyze the effect of using audiovisual media on the chest pass ability of tenth-grade students at SMAN 1 Cibitung in basketball learning. The analysis was conducted on 35 students using a one group pretest-posttest design.

Tabel 3. Statistical description results

	Valid	Missing	Mean	Std. Deviation	Minimum	Maximum
Initial activity pre-test	35	0	2.629	0.69	1	4
Core activities pre-test	35	0	2.543	0.852	1	4
Final activity pre-test	35	0	2.2	0.833	1	4
Chest Pass Pre-test	**35**	**0**	**7.371**	**1.864**	**4**	**10**
Initial activity post-test	35	0	3.171	0.785	2	4
Core activities post-test	35	0	2.914	0.853	2	4
Final activity post-test	35	0	3.086	0.702	2	4
Chest Pass Post-test	**35**	**0**	**9.171**	**1.581**	**6**	**12**

Table 3 shows that the average total chest pass skill score increased by 1.800 points (24.42%), from 7.371 ± 1.864 in the pretest to 9.171 ± 1.581 in the posttest. The largest increase was in the final attitude component (0.886 points), followed by initial posture (0.542 points) and movement execution (0.371 points). This improvement pattern aligns with the quasi-experimental study by Tannoubi et al. (2023), which found that the group of beginner basketball players who received video modeling showed better passing test performance compared to the control group ($p = 0.021$; $d = 0.87$). However, the study used different passing instruments and involved a comparison group. The differences in the magnitude of change between components in this study also need to be interpreted specifically, considering that Fazeli et al. (2025) show that observational learning can produce changes in movement coordination that are not always accompanied by comparable changes in accuracy. Thus the increase in total scores and the three components are measurable descriptive findings, while differences in responses among components still require further testing.

Tabel 4. Normality test result

	Shapiro-Wilk	P-value of Shapiro-Wilk
Initial activity pre-test	0.825	< .001
Core activities pre-test	0.874	< .001
Final activity pre-test	0.866	< .001
Chest Pass Pre-test	**0.923**	**0.017**
Initial activity post-test	0.794	< .001
Core activities post-test	0.779	< .001
Final activity post-test	0.805	< .001
Chest Pass Post-test	**0.951**	**0.123**

Table 4 shows that all skill components have distributions that differ significantly from normality in the pretest and posttest measurements ($p < 0.001$). In the total score, the pretest distribution also showed significant deviations ($W = 0.923$; $p = 0.017$), while the posttest distribution did not show significant deviations ($W = 0.951$; $p = 0.123$). These results illustrate the characteristics of the distribution at each measurement time, so the use of the Wilcoxon signed-rank test is maintained as a nonparametric approach to analyze discrete paired score changes.

Table 5. Wilcoxon signed-rank test

Measure 1		Measure 2	W	z	df	p
Initial activity pre-test	-	Initial activity post-test	16	-3.179		< .001
Core activities pre-test	-	Core activities post-test	8	-2.953		< .001
Final activity pre-test	-	Final activity post-test	0	-4.197		< .001
Chest Pass Pre-test	-	**Chest Pass Post-test**	5	-4.843		< .001

Note. Wilcoxon signed-rank test

Based on Table 5, the total score test showed a significant difference between the pretest and posttest ($W = 5$; $z = -4.843$; $p < 0.001$), with changes consistent with the improvement in average skills. These findings align with the results of Tannoubi et al. (2023) regarding passing performance after video modeling, as well as the research of Bouzid et al. (2025), which showed an increase in scores for performing acrobatic gymnastics techniques in groups receiving video feedback compared to verbal feedback. Nevertheless, these studies used different designs and interventions. Therefore, Wilcoxon's significance in this study confirms the difference in scores within the same group, not proves that audiovisual media exclusively causes skill improvement. The p-value for initial posture and movement execution also requires confirmation before being used to conclude the significance of each component.

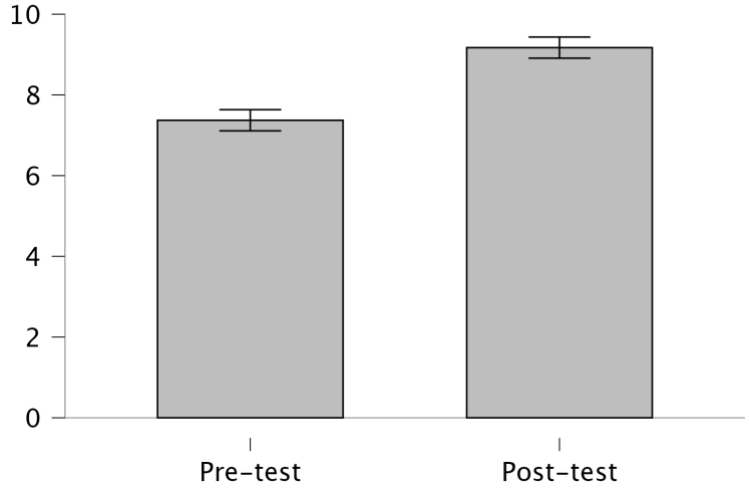


Figure 2. Comparation chest pass ability pre and post test

Figure 2 shows an increase in the average chest pass score from 7+ to 9+, indicating the direction of performance changes after learning. These findings align with Rekik et al. (2023), who reported that video visualization results in better basketball action learning performance than static image presentation. However, Rekik et al.'s research focused on tactical actions, not on chest passing technique assessment. Bazzini et al. (2022) also found that the combination of action observation and movement execution resulted in greater performance improvements than observational learning or separate practice in different motor tasks. Therefore, this research graph supports score changes during the learning period but cannot yet show the specific contribution of audiovisual media compared to direct practice and teacher feedback. The mean graph also does not show the direction of change for each individual participant.

Table 6. Paired sample effect size

Measure 1		Measure 2	Rank-Biserial Correlation	SE Rank-Biserial Correlation	95% CI for Rank-Biserial Correlation	
					Lower	Upper
Initial activity pre-test	-	Initial activity post-test	-0.832	0.256	-0.936	-0.592
Core activities pre-test	-	Core activities post-test	-0.867	0.285	-0.956	-0.632
Final activity pre-test	-	Final activity post-test	-1	0.234	-1	-1
Chest Pass Pre-test	-	**Chest Pass Post-test**	-0.981	0.2	-0.991	-0.959

Table 6 shows a large rank-biserial effect size on the total chest pass skill score ($r = -0.981$), with the direction dominated by posttest score increases. The magnitude of effect sizes in all three components also shows the dominance of one-way changes, especially final attitudes with $r = -1.000$, meaning all pairs with non-zero differences have the same change direction. These effect sizes cannot be directly compared numerically with Cohen's d used by Tannoubi et al. (2023) because they have different statistical definitions. Furthermore, Hiromitsu and Ishikura (2021) found no difference in the effect of selecting self-modeling videos on consistent performance between groups in throwing tasks. This difference in evidence confirms that the magnitude of change within a group is not equivalent to the evidence of the superiority of a form of learning media.

Table 7. N-Gain score

	Valid	Missing	Median	Mean	Std. Deviation	Shapiro -Wilk	P-value of Shapiro-Wilk	Minimum	Maximum
N-Gain Score	35	0	0.4	0.394	0.307	0.927	0.023	-0.5	1

Table 7 shows an average N-Gain of 0.394 with a median of 0.400 and a standard deviation of 0.307. The value range of −0.500 to 1.000 illustrates variations in skill changes among participants, including the presence of negative gain values. The distribution of N-Gain also deviates significantly from normality (W = 0.927; p = 0.023). These variations in change are relevant to the findings of Fazeli et al. (2025), which show that observational learning outcomes can differ according to visual information, task characteristics, and performance indicators assessed. However, Fazeli et al.'s study did not use chest pass skill N-Gain, so it cannot be used as a basis to standardize the magnitude of improvement. N-Gain in this study was maintained as an additional descriptive indicator, with final interpretation depending on the confirmation of the theoretical maximum score and calculations of each participant.

DISCUSSION

This study shows the development of chest pass skills after students participate in basketball learning assisted by audiovisual media. Changes are seen in the quality of initial posture, movement execution, and final posture, with more prominent development in movement completion. Pedagogically, this pattern reflects the increasingly organized series of chest passing techniques during learning. However, these findings only show measurable performance changes in the same group. These changes cannot yet be exclusively linked to audiovisual presentations because repetitive practice, teacher instructions, and test experience may also play a role. Observation of movement models can help students recognize the relationship between body position, arm push direction, ball release, and advanced movement. However, observation only becomes a meaningful learning experience when visual information is translated into action and corrected through practice. Bazzini et al. (2022) support the importance of integrating observation and execution, while Nahardiya et al. (2022) show that two-way interaction in learning movement sequences can produce different execution qualities than one-way observation. On different perceptual-motor tasks, Lagarrigue et al. (2021) showed that audiovisual stimulus suitability has the potential to support procedural learning. Because tasks and populations differ, the three studies provide reasonable explanations, not evidence of mechanisms tested in this chest pass study.

Changes in the implementation components of the technique also need to be separated from the actual passing results. Fazeli et al. (2025) show that movement coordination can change without an equal increase in accuracy. The review by Conte et al. (2023) regarding action observation in landing techniques also confirms that learning impacts can vary according to the biomechanics indicators assessed. Therefore, the development of final posture cannot be interpreted as evidence that target accuracy, passing decisions, or game performance improve. The variation in the benefits of visual cues discussed by Sorgente et al. (2022) further emphasizes the importance of alignment between demonstration content and assessment indicators.

In the context of basketball, Tannoubi et al. (2023) reported the benefits of video modeling for the technical skills of beginner players, while Rekik et al. (2021, 2023) highlighted the role of

visualization forms in learning tactical actions. These studies are aligned in positioning visual information as a learning resource but do not measure constructs identical to chest pass techniques in regular PJOK. Cross-disciplinary evidence also shows potential for modeling before training: Tannoubi et al. (2026) studied video demonstrations before handball shooting practice, while Kachouri et al. (2026) tested expert modeling on children's tennis serve techniques. Sönmez et al. (2026) also studied video modeling in teaching gymnastics for children with autism. Differences in skills, age, participant characteristics, and comparative design limit direct generalization of this study.

Video feedback-based research provides additional support while also showing differences in treatment forms. Ghorbel et al. (2026) evaluated gymnastics learning that combines video content and face-to-face instruction. Souissi et al. (2021), Bouzid et al. (2025), and Fauzi et al. (2026) examined video motion evaluation on different sports tasks. Schussler et al. (2024) found benefits of using feedback that combines athlete performance recordings and expert models in tackle techniques, while Geisen et al. (2026) explored direct motion comparisons through video displays. X. Zhang (2025) linked user-controlled video feedback with athletic learning evaluation. Although relevant, the demonstration observations prepared by teachers are not the same as feedback on the students' own movement recordings; the mechanism and dosage of their use should not be considered identical.

The quality of pedagogical interaction can also determine how video is utilized. San et al. (2022) studied video-supported peer assessment, while Diekhoff (2024) demonstrated the usefulness of game recordings for conversations and the formulation of tactical ideas among students. Girard and Vors (2021) emphasize that teacher-student interaction in physical education is contextual. Greve et al. (2022) show that digital media can be integrated with a game-based approach. These four studies remind us that visual displays do not replace guidance, communication, or practical opportunities. However, current research does not measure the quality of interactions, tactical discussions, or student engagement, so these explanations remain pedagogically plausible.

Research with more diverse technologies shows the importance of distinguishing between media and learning outcomes. Namli (2025) evaluated virtual reality-assisted video modeling for swimming skills, while Safari et al. (2025) integrated multimedia with knowledge of rules and the value of sportsmanship in table tennis. Topalska (2025) discussed visualization of moving games using augmented reality, while Al-Sinani and Al Taher (2023) examined the use of similar technology for teaching skills for PJOK teachers. This series of evidence shows that technical, conceptual, social, and pedagogical outputs need to be treated as separate constructs; the increase in passing technique scores in this study did not prove changes in other constructs.

Evidence that does not fully support video advantage is important to maintain. Feng et al. (2025) found that the development of table tennis skills in both video-assisted learning and traditional learning, while Šitić et al. (2025) found no clear difference between live demonstration and video instruction for swimming skills. Hiromitsu and Ishikura (2021) also reported that the choice of self-modeling video does not always provide consistent performance advantages. Sasaki et al. (2026) even identified dependence on audiovisual cues when practice cues are reduced in virtual rhythmic game tasks. Therefore, improvements during learning are insufficient to conclude media superiority or outcome resilience without further measurement.

Theoretically, audiovisual demonstrations can help form motion references, which are then tested through execution and feedback. Ashraf et al. (2023) discussed the effect of modeling methods on skill acquisition and retention, while Yang et al. (2026) showed that demonstration speed can be related to movement accuracy and cognitive demands in Tai Chi learning. Wang et al.'s (2026) review

of self-modeling showed that performance benefits depend on dose characteristics and may not necessarily persist after treatment ends. This research differs from external model demonstrations used in chest pass learning. Thus, explanations such as visual attention, formation of movement representations, or skill consolidation should be positioned as theoretical interpretations, not processes that have been directly measured.

Multimodal information presentation requires pedagogical accuracy, not just adding stimuli. Sha and Chiu (2025) studied the guidance of two sensory modalities in movement learning related to basketball shooting, while Ramezanzade et al. (2023) evaluated audiovisual information on motor imagery of jump shot movements. Both studies support the need to pay attention to information focus and task characteristics, but their indicators differ from chest passing technique assessments. Findings by Lagarrigue et al. (2021) and Sasaki et al. (2026) together show that sensory cues can assist learning under certain conditions while potentially causing dependency when cues are not available. Therefore, demonstrations should be combined with practices that gradually reduce dependence on the display.

Besides the media content, the form of movement evaluation must be consistent with the learning objectives. Schussler et al. (2024) and Geisen et al. (2026) highlight the importance of comparing actual movements with expected examples, while Nahardiya et al. (2022) place two-way feedback as part of learning the sequence of motions. In the present study, assessments of initial attitude, execution, and final posture provide relevant observational indicators for technical skills. However, without documentation of validity, reliability among assessors, and consistency of test conditions, score changes cannot yet be fully separated from possible assessment variations.

PJOK teachers can consider short demonstration videos that explicitly show the chest pass technique phase, followed by pairing practice and feedback based on movement rubrics. The use of videos should be adjusted to the availability of facilities and teachers' abilities, not an absolute requirement for learning. Kempa et al. (2025) document the challenges of digital literacy, facilities, and policy support in technology integration in PJOK in Indonesia. Meanwhile, Al-Sinani and Al Taher (2023) emphasize the importance of teachers' pedagogical readiness when utilizing visual technology. These recommendations are reasonable implementations based on the literature, not intervention components that have been proven to have been applied or tested separately in this study.

Interpretation of results remains limited to a single-group design without comparisons, limited research locations, and documentation of learning implementation that is not yet fully detailed. The duration of the presentation, number of repetitions, practice intensity, and feedback form are not sufficient to assess the implementation of the intervention. Evidence of instrument validity and reliability also needs to be clarified. Furthermore, the study did not measure retention or skill transfer in game situations. Minkels et al. (2025), in reviewing children's swimming learning methods, identified similar issues such as limited retention testing, comparison groups, and intervention details. The review findings support the importance of improving design quality but do not serve as direct evidence of chest pass effectiveness.

Further research is recommended to use comparison groups with equivalent practice opportunities, dose recording and video implementation, as well as evaluators using tested rubrics. Technical assessment needs to be separated from passing accuracy, passing success during play, and psychological variables. Retention and transfer tests after audiovisual cues are reduced are necessary to assess learning continuity, as warned by Wang et al. (2026) and Sasaki et al. (2026). Overall, this study provides preliminary evidence of changes in technique skills during audiovisual-assisted

learning but has not yet proven that these media are superior to live demonstrations or that the changes persist in real-life game situations.

CONCLUSION

This study shows that the chest pass skills of grade X students at SMAN 1 Cibitung experience positive changes after participating in basketball learning assisted by audiovisual media. Changes are visible in the overall skill scores as well as the initial attitude components, movement implementation, and final posture. These findings answer the research objectives, which are to identify differences in abilities before and after learning among the same participants. Pedagogically, audiovisual demonstrations can be considered as a source of movement information to help students observe the stages of technique and relate them to direct practice and teacher feedback. Nevertheless, the study used a pre-experimental single-group design with pretest–posttest measurements without comparison groups. Therefore, the observed changes cannot be stated as an exclusive result of audiovisual media nor as evidence of its superiority compared to other learning methods. Repetition of exercises, teacher guidance, previous experience, and repeated tests remain alternative explanations. Additionally, assessment focuses on the quality of technique execution, so findings do not prove improved passing accuracy, tactical comprehension, long-term retention, or skill application in the game. Further research with control groups, tested instruments, and retention and transfer measurements is needed to clarify the contribution of audiovisual media to chest pass learning.

RECOMMENDATION

Physical Education, Sports, and Health (PJOK) teachers can consider using audiovisual media as a tool to demonstrate the chest pass technique, rather than as a substitute for direct instruction. Learning videos should clearly show the components of initial attitude, movement execution, and final posture, then combined with paired exercises, structured practice, and teacher feedback based on skill assessment indicators. Media selection needs to be adjusted to learning objectives, student characteristics, and availability of school facilities. Learning evaluation also needs to distinguish the quality of technique implementation from the accuracy of passing and skill success in game situations. Further research is recommended to use controlled or comparative experimental designs with equal practice opportunities between groups to identify specific contributions of audiovisual media. Chest pass assessment instruments need to be equipped with evidence of validity, reliability among assessors, standardized scoring rubrics, and consistent measurement procedures. Documentation of video viewing duration, training frequency, number of repetitions, teacher feedback, and intervention implementation are needed to improve research repeatability. Future research also needs to involve several schools, separate measurements of technical and tactical skills, and include retention tests and skill transfer in game situations. The limitations of using a single group without comparisons, intervention documentation, and instrument verification in this study need to be key considerations in designing further research.

REFERENCES

Al-Sinani, Y., & Al Taher, M. (2023). Enhancing teaching skills of physical education teachers in the Sultanate of Oman through augmented reality strategies: A comprehensive feedback-based analysis. Cogent Social Sciences, 9(2), 2266253. https://doi.org/10.1080/23311886.2023.2266253

Ashraf, R., Abdoli, B., Khosrowabadi, R., Farsi, A., & Pineda, J. A. (2023). The effect of modeling methods on mirror neuron activity and a motor skill acquisition and retention. Basic and Clinical Neuroscience, 14(5), 631–645. https://doi.org/10.32598/bcn.2021.3245.1

Aydogan, A., & Demirok, M. S. (2023). The effectiveness of computer aided video modeling in teaching basic basketball movements to individuals with Down syndrome. Children, 10(1), 153. https://doi.org/10.3390/children10010153

Bazzini, M. C., Nuara, A., Scalona, E., De Marco, D., Rizzolatti, G., Avanzini, P., & Fabbri-Destro, M. (2022). The proactive synergy between action observation and execution in the acquisition of new motor skills. Frontiers in Human Neuroscience, 16, 793849. https://doi.org/10.3389/fnhum.2022.793849

Bouzid, M. S., Melki, H., Romdhan, M. B., Hammoudi, S., Khalfallah, W., Rezgani, Y., Racil, G., & Padulo, J. (2025). The impact of video feedback on motor skill and motivation in acrobatic gymnastics through the use of digital tools in physical education. Journal of Human Sport and Exercise, 20(4), 1277–1292. https://doi.org/10.55860/pbyv8s24

Conte, D., Miani, J., & Pinzini, C. (2023). The effects of action observation in the lower limb landing biomechanics: A systematic review and meta-analysis. Advances in Rehabilitation, 37(2), 9–20. https://doi.org/10.5114/areh.2023.127924

Diekhoff, H. (2024). 'I can show you; here's the video'–video-supported student-led debates in game-based approaches. Cogent Education, 11(1), 2398842. https://doi.org/10.1080/2331186X.2024.2398842

Fauzi, R. A., Suherman, A., Saptani, E., Tingsabhat, S., & Heryanto, M. (2026). The effect of digital video feedback on roundoff learning outcomes in gymnastics learning. Frontiers in Sports and Active Living, 8, 1771596. https://doi.org/10.3389/fspor.2026.1771596

Fazeli, D., Jabbari, F., Ghohestani, L., & Taghizadeh, H. (2025). Manipulation of information type and task constraints during observational learning improve coordination but not accuracy and control parameters. PLOS ONE, 20(10), e0317270. https://doi.org/10.1371/journal.pone.0317270

Feng, D., Cossich, V. R. A., Abdelrasoul, E., Campelo, A. M., & Katz, L. (2025). The impact of video performance technology and peer-to-peer learning on table tennis skill acquisition in elementary students. Frontiers in Sports and Active Living, 7, 1653334. https://doi.org/10.3389/fspor.2025.1653334

Geisen, M., Baumgartner, T., Riedl, N., & Klatt, S. (2026). Real-time feedback in video-based motor learning: A pilot study exploring innovative training methods. Research and Practice in Technology Enhanced Learning, 21, 21038. https://doi.org/10.58459/rptel.2026.21038

Ghorbel, A., Yaakoubi, M., Alsaeed, M. I., Said, N. B., Masmoudi, L., Scharenberg, S., Gharbi, A., & Trabelsi, O. (2026). A quasi-experimental study of the video-based "Did You Know?" blended learning model in physical education: Impact on motor skills, knowledge acquisition, and motivation in gymnastics. Frontiers in Psychology, 17, 1695403. https://doi.org/10.3389/fpsyg.2026.1695403

Girard, A., & Vors, O. (2021). Knowledge mobilized in teacher–student interactions in PE in difficult vocational high school classes: Enacted knowledge. Frontiers in Psychology, 12, 664677. https://doi.org/10.3389/fpsyg.2021.664677

Greve, S., Diekhoff, H., & Süßenbach, J. (2022). Learning soccer in elementary school: Using teaching games for understanding and digital media. Frontiers in Education, 7, 862798. https://doi.org/10.3389/feduc.2022.862798

Han, Y., Syed Ali, S. K. B., & Ji, L. (2022). Use of observational learning to promote motor skill learning in physical education: A systematic review. International Journal of Environmental Research and Public Health, 19(16), 10109. https://doi.org/10.3390/ijerph191610109

Hasyim, A. H., Prabowo, E., Juniarto, M., Suparman, S., & Haris, I. N. (2025). Model pembelajaran passing chest pass bola basket berbasis permainan. Biormatika: Jurnal Ilmiah Fakultas

Keguruan dan Ilmu Pendidikan, 11(1), 15–21. https://doi.org/10.35569/biormatika.v11i1.2215

Hiromitsu, Y., & Ishikura, T. (2021). Effects of learners' choice of video self-modeling on performance accuracy and perceived cognitive consistency. Journal of Physical Education and Sport, 21(3), 1284–1293. https://doi.org/10.7752/jpes.2021.03163

Kachouri, E., Ezeddine, G., Kachouri, H., Clark, C. C. T., Mkaouer, B., & Souissi, N. (2026). The acute effect of expert video modelling on tennis serve performance in 7- to 9-year-old players. Acta of Bioengineering and Biomechanics, 28(3), 43–53. https://doi.org/10.37190/abb/230881

Kempa, R., Sahalessy, A., Souisa, M., & Apituley, V. H. R. (2025). Barriers to ICT integration in elementary physical education: Evidence from Tual City, Maluku Province. Online Learning in Educational Research, 5(1), 217–229. https://doi.org/10.58524/oler.v5i1.685

Lagarrigue, Y., Cappe, C., & Tallet, J. (2021). Regular rhythmic and audio-visual stimulations enhance procedural learning of a perceptual-motor sequence in healthy adults: A pilot study. PLOS ONE, 16(11), e0259081. https://doi.org/10.1371/journal.pone.0259081

Li, Z., & Liu, X. (2026). Effects of blended learning on physical fitness and basketball skills of male college students: A cluster randomized controlled trial. Frontiers in Psychology, 17, 1792646. https://doi.org/10.3389/fpsyg.2026.1792646

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, 1505301. https://doi.org/10.3389/fspor.2025.1505301

Nahardiya, G., Markus, A., Bennet, R., & Shamay-Tsoory, S. G. (2022). The benefits of learning movement sequences in social interactions. Frontiers in Psychology, 13, 901900. https://doi.org/10.3389/fpsyg.2022.901900

Namli, S., Özdemir, K., Sen, I., & Bedir, D. (2025). Virtual reality-supported video modeling for enhancing motor skill acquisition in swimming. BMC Sports Science, Medicine and Rehabilitation, 17(1), 182. https://doi.org/10.1186/s13102-025-01241-z

Ramezanzade, H., Badicu, G., Cataldi, S., Parimi, F., Mohammadzadeh, S., Mohamadtaghi, M., Zamani Sani, S. H., & Greco, G. (2023). Sonification of motor imagery in the basketball jump shot: Effect on muscle activity amplitude. Applied Sciences, 13(3), 1495. https://doi.org/10.3390/app13031495

Rekik, G., Belkhir, Y., Mezghanni, N., Jarraya, M., Chen, Y.-S., & Kuo, C.-D. (2021). Learning basketball tactical actions from video modeling and static pictures: When gender matters. Children, 8(11), 1060. https://doi.org/10.3390/children8111060

Rekik, G., Jouira, G., Belkhir, Y., Jarraya, M., Kuo, C.-D., & Chen, Y.-S. (2023). The effect of dynamic versus static visualizations on acquisition of basketball game actions: A diurnal study. Scientific Reports, 13(1), 18077. https://doi.org/10.1038/s41598-023-45278-x

Rezaei, M., Hatami, F., & Lotfi, G. (2023). The impact of different attentional focus strategies during modeling on the acquisition and retention of free throws in basketball. International Journal of Sport Studies for Health, 6(1), e135272. https://doi.org/10.61838/kman.intjssh.6.1.6

Safari, I., Supriyadi, T., & Susilawati, D. (2025). Holistic pedagogical model for table tennis: Integrating regulations, multimedia, and sportsmanship. International Journal of Human Movement and Sports Sciences, 13(3), 636–646. https://doi.org/10.13189/saj.2025.130318

Safitri, D. A., Ma'mun, S., & Sumarsono, R. N. (2022). Pengaruh media audio visual terhadap kemampuan passing chest pass dalam ekstrakulikuler bola basket SMP Negeri 1 Lemahabang. JIIP: Jurnal Ilmiah Ilmu Pendidikan, 5(12), 5325–5329. https://doi.org/10.54371/jiip.v5i12.1195

San, N. C., Lee, H. S., Bucholtz, V., Fung, T., Rafiei Milajerdi, H., & Katz, L. (2022). Nature and quality of interactions between elementary school children using video-modeling and peer-to-peer evaluation with and without structured video feedback. Frontiers in Education, 7,

856918. https://doi.org/10.3389/feduc.2022.856918
Sasaki, R., Niijima, A., Park, C., & Ogawa, T. (2026). Congruent sonification during practice impairs cue-reduced recall in a virtual reality rhythm-game task. Frontiers in Psychology, 17, 1–11. https://doi.org/10.3389/fpsyg.2026.1813641
Schussler, E., Jagacinski, R. J., Chaudhari, A., Buford, J. A., & Onate, J. A. (2024). Models of video feedback for youth athletes performing an American football tackle. Journal of Athletic Training, 59(3), 281–288. https://doi.org/10.4085/1062-6050-0602.22
Sha, L., & Chiu, W. H. (2025). Effect of guided dual-sensory information on motor learning outcomes based on spatiotemporal dimensions. PLOS ONE, 20(11), e0337236. https://doi.org/10.1371/journal.pone.0337236
Šitić, K., Bavčević, D., & Bavčević, T. (2025). Implementing a new method for teaching freestyle and back-stroke technique in high education PE—a comparative study. Journal of Kinesiology and Exercise Sciences, 13(23), 38–46. https://doi.org/10.5604/01.3001.0055.2686
Soederajat, S., Mahardhika, D. B., & Aminudin, R. (2022). The effect of drill training methods on the basic skills of basketball chest pass for extracurricular students at SMA Negeri 1 Sukatani. Jurnal Speed (Sport, Physical Education, Empowerment), 5(2), 153–159. https://doi.org/10.35706/jurnalspeed.v5i2.7116
Sönmez, H. G., Ergin, M., Koçak, Ç. V., Bozdağ, B., Kılınç, Ö., Turan, E., Canlı, U., & Aldhahi, M. I. (2026). The effect of video modeling on gymnastics-based motor skills in children with autism spectrum disorder. Healthcare, 14(8), 1009. https://doi.org/10.3390/healthcare14081009
Sorgente, V., Cohen, E. J., Bravi, R., & Minciacchi, D. (2022). The best of two different visual instructions in improving precision ball-throwing and standing long jump performances in primary school children. Journal of Functional Morphology and Kinesiology, 7(1), 8. https://doi.org/10.3390/jfmk7010008
Souissi, M. A., Ammar, A., Trabelsi, O., Glenn, J. M., Boukhris, O., Trabelsi, K., Bouaziz, B., Zmijewski, P., Souissi, H., Chikha, A. B., Driss, T., Chtourou, H., Hoekelmann, A., & Souissi, N. (2021). Distance motor learning during the COVID-19 induced confinement: Video feedback with a pedagogical activity improves the snatch technique in young athletes. International Journal of Environmental Research and Public Health, 18(6), 3069. https://doi.org/10.3390/ijerph18063069
Tannoubi, A., Ouergui, I., Srem-Sai, M., Hagan, J. E., Quansah, F., & Azaiez, F. (2023). Effectiveness of video modeling in improving technical skills in young novice basketball players: A quasi-experimental study. Children, 10(4), 687. https://doi.org/10.3390/children10040687
Tannoubi, A., Ahmed, N., Hagan, J. E., Srem-Sai, M., Geantă, V. A., & Azaiez, F. (2026). Effects of pre-session video observational modeling on emotional intelligence and 9 m shooting performance in U14 male handball players: A randomized controlled trial. Children, 13(5), 655. https://doi.org/10.3390/children13050655
Topalska, R., & Rumenov, Y. (2025). Facilitating the visualisation of moving games by implementing augmented reality in primary physical education classes. TEM Journal, 14(1), 816–822. https://doi.org/10.18421/TEM141-72
Wang, Z., Li, H., Wang, Q., Gao, Z., & Niu, J. (2026). The impact of self-modeling on athletic performance and self-efficacy: A systematic review and meta-analysis. Frontiers in Sports and Active Living, 8, 1809566. https://doi.org/10.3389/fspor.2026.1809566
Yang, S., He, S., & Shi, B. (2026). fNIRS cortical activation in Tai Chi observational learning. Frontiers in Psychology, 17, 1710673. https://doi.org/10.3389/fpsyg.2026.1710673
Zhang, X. (2025). The effectiveness of self-controlled video feedback in improving the teaching of track and field sports in physical education teachers from Chinese universities. International Journal of Education and Practice, 13(2), 753–771. https://doi.org/10.18488/61.v13i2.4131