Attractive : Innovative Education Journal
Vol. 8 No. 4, December 2026

The Effect of Video-Based Learning Media on the Learning Outcomes of Backward Roll among Students of SMP Negeri 20 Padang

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ARTICLE INFO
Article history:
Received
August 05, 2026
Revised
October 16, 2026
Accepted
November 12, 2026

ABSTRACT

Among the floor gymnastics skills taught in junior high school, the backward roll stands out as particularly challenging, since executing it well demands arm strength, flexibility, and courage all at once. At SMP Negeri 20 Padang, one factor behind students' weak performance in this skill appears to be the narrow range of teaching approaches and instructional materials used in class. This research set out to examine whether video-based instruction could improve students' backward roll performance at the school. A quantitative, experimental design was applied, specifically a one-group pretest–posttest format. All 30 eighth-grade students in class VIII-5 took part, chosen through total sampling since the entire class served as the population. Performance was measured with a backward roll assessment rubric, and the resulting data were checked for normality using Shapiro-Wilk before being tested with a paired-samples t-test in SPSS. Scores rose from an average of 61.69 before the intervention to 73.56 afterward — a gain of roughly 19.24%. The paired t-test returned a significance value of 0.000, well under the 0.05 threshold, confirming that the pre- and post-intervention scores differed meaningfully. These findings support the conclusion that incorporating video as a teaching tool meaningfully boosts students' backward roll performance at SMP Negeri 20 Padang.

Keywords: Video-Based Learning Media, Learning Outcomes, Backward Roll, Floor Gymnastics, Physical Education

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INTRODUCTION

Within the school curriculum, physical education, sport, and health (PJOK) holds a significant place — its role extends beyond building physical fitness and motor skills to shaping students' knowledge of health and fostering positive attitudes toward staying active(Faisal et al., 2024). Floor gymnastics stands as one of the PJOK components requiring especially careful attention to movement execution. Skills like rolling, maintaining balance, and providing support through this activity help build students' coordination, flexibility, and overall physical competence, cementing its place as a key element of PJOK instruction(Gultom et al., 2024). In practice, however, floor gymnastics learning often does not run optimally. This is reflected in students' still-low mastery of the material and the failure of most students to reach the Minimum Completeness Criteria. Therefore, an appropriate method of delivering material is needed so that floor gymnastics movements are easier for students to understand and practice(Jabarudin & Salman, 2026) .

The backward roll is one of the basic floor gymnastics movements classified as difficult for junior high school students to master because it involves the coordination of arm strength, body flexibility, and courage simultaneously. A study conducted at SMP Negeri 29 Padang, for example, found that many students still had difficulty performing the backward roll with correct technique due to insufficient practice and understanding of the movement stages(Pratama et al., 2022) . Similar difficulties were also commonly found in the forward roll material, influenced by teachers' lack of varied teaching methods and limitations in the learning

media used(Mahmudah & Darmawan, 2022). In addition, students' fear of movements considered dangerous also made floor gymnastics learning less appealing(Zalil Ashidqy et al., 2023).

Limited facilities, practice time, and variation in teaching methods are recurring obstacles found in various studies on floor gymnastics learning in schools. In fact, the availability of adequate facilities and infrastructure has been shown to be closely related to students' motivation and PJOK learning outcomes(Mutiara et al., 2024) . This condition requires teachers to be more creative in choosing learning media that can help students visualize movements repeatedly, clearly, and in an easily imitable way, without always depending on direct teacher demonstration limited by class time(Sidiq & Suharjana, 2023).

Among the possible solutions, video-based media stands out as particularly promising. By blending visuals, audio, and motion together, instructional video tends to hold students' attention more effectively and convey material more clearly than spoken explanation alone (Afrilia et al., 2022).What makes video especially useful is that it can be paused, rewound, and replayed — students can revisit the exact segment they struggled with, which helps them piece together the correct sequence of movements and copy it accurately(Sidiq & Suharjana, 2023). Applied to backward roll instruction specifically, video allows the technique to be broken down and observed step by step in a way that's both structured and easy to follow. It also lets students return to any stage of the movement whenever they need extra reinforcement(Prakasa et al., 2025). As instructional technology continues to evolve, interactive video is increasingly being adopted in floor gymnastics teaching — helping students engage with movement stages more visually and flexibly, which in turn strengthens both their technical understanding and the overall learning experience(Yang et al., 2026)

Several previous studies have proven the positive effect of video media on floor gymnastics learning and PJOK in general. Setiawan et al. developed floor gymnastics learning media oriented toward ICT TPACK for seventh-grade junior high school students and found that the media was declared highly valid and suitable for use as learning media. The use of this video-based media helped deliver material more systematically, thereby supporting student understanding of basic floor gymnastics movement techniques(Setiawan et al., 2022). A study conducted at SMP Negeri 1 Batang Anai developed Kinemaster-based instructional video media for the rounded backward roll floor gymnastics material, and the results showed that the media was highly suitable for use as learning media(Saputra et al., 2023). Meanwhile, research by (Sahraeni, 2023) found that the application of visual video media in forward roll and backward roll floor gymnastics material helped students understand the material taught and improved learning outcomes, with classical completeness reaching 90.90%. These research results indicate that video media has considerable potential in learning. However, the success of using this media still depends on how it is implemented in schools and its suitability to the movement material being taught(Sahraeni, 2023).

Nevertheless, research specifically discussing the effect of video media on backward roll learning outcomes is still not widely found, especially at the junior high school level in the city of Padang. This is important because the backward roll has different characteristics from the forward roll and other gymnastics movements, so the use of instructional video also needs to be adapted to the needs of the material. Studies on the basic movement abilities of students in Padang in floor gymnastics material have so far focused more on muscle strength and body flexibility factors(Siregar et al., 2022), while the aspect of learning media as a variable affecting backward roll learning outcomes specifically has not been widely studied.

Based on preliminary observation, floor gymnastics learning on the backward roll material at SMP Negeri 20 Padang still faces obstacles similar to those found in other schools, namely limited practice time, minimal variation in teaching media, and many students who are not yet able to perform the backward roll with correct technique. PJOK teachers tend to rely on direct demonstration, which students can only see once per session, so students who do not understand the movement on the first attempt have difficulty correcting their mistakes. This condition affects student learning outcomes, which have not yet reached the expected completeness criteria for the backward roll material.

Given these circumstances, this study zeroes in on how video-based learning media shapes backward roll outcomes among students at SMP Negeri 20 Padang. The findings are intended to offer concrete evidence on video's value as an alternative to conventional demonstration-only teaching, while also giving PJOK teachers a practical reference point for designing floor gymnastics lessons that better accommodate the varying movement abilities within a class.

METHOD

At its core, research is a structured sequence of scientific steps undertaken to answer a question, uncover how variables relate to one another, and build new knowledge within a given field(Naureen et al., 2022). This study relied on an experimental approach using a One Group Pretest-Posttest Design within a quantitative framework. This particular design has previously been applied in floor gymnastics research to track shifts in student ability before and after an intervention(Mateley et al., 2025). It works by observing a single group both before and after treatment, allowing researchers to trace how students' grasp of backward roll technique develops over that period. The pretest was administered prior to any intervention, while the posttest followed once all treatment sessions had concluded, giving a basis for judging how effective the intervention had been.

Experimental research aims to examine the effect of a particular treatment on students' learning outcomes. In the context of backward roll learning, students may experience difficulties in performing the movement correctly and efficiently. These difficulties may be associated with the coordination skills and physical abilities required to execute the sequence of movements effectively. Therefore, an appropriate and systematic learning process is needed to facilitate students' understanding and gradual mastery of the fundamental techniques involved in performing a backward roll(Handayani et al., 2025) .(Sugiyono, 2022)frames the quantitative method as one rooted in positivist philosophy, applied to study a defined population or sample through structured instruments, with the resulting data analyzed statistically to test hypotheses set out in advance.

The study took place at SMP Negeri 20 Padang Jl. Sutan Syahrir No. 216, Mata Air, South Padang in August 2026, drawing its population from the entire class VIII-5 cohort of 30 students. Since every member of the class was included with none excluded, this counts as a saturated sample — meaning sample size and population size were identical. A population, in this context, refers to the full set of people, objects, or events that a study is centered on(Candra Susanto et al., 2024).

Data collection in this study used a backward roll skill assessment instrument covering indicators of starting position, head position, hand takeoff, leg push, back support, and final position. These indicators were used to assess the level of mastery of students' backward roll skills in floor gymnastics learning(Pratama et al., 2022). The data collection process began with a pretest using the demonstration method. One week later, treatment began and was given for 2 weeks with a duration of two class periods, or the equivalent of 1 effective hour per session, followed by a posttest after all treatment was completed. The purpose of this study was to improve understanding of the backward roll technique in floor gymnastics using video-based learning media. Video-based learning media can help students understand material gradually, because movements are displayed through systematic examples and stages, making it suitable for use in efforts to improve understanding of basic floor gymnastics technique(Trabelsi et al., 2022). The collected data was then analyzed to measure the effectiveness level of the applied treatment. Data is a crucial matter in research, so during the data collection process it must meet the requirements for checking data validity. It is explained epistemologically that research is a series of scientific activities aimed at finding answers to a problem and generating new knowledge(Husnullail et al., 2024).

Data analysis was carried out using SPSS, a tool widely relied upon in quantitative research within physical education and sport. Two tests were applied: Shapiro-Wilk to check whether the pretest and posttest data followed a normal distribution, and a paired-samples t-test to determine whether outcomes shifted meaningfully between the two time points. A

significance threshold of 0.05 was used throughout — data were treated as normally distributed when the Shapiro-Wilk value exceeded 0.05, and a paired t-test result below 0.05 was taken to indicate a genuine difference between pretest and posttest scores(Yuliati et al., 2023).

RESULT AND DISCUSSION

Learning media plays a central role in how well physical education instruction succeeds. Choosing the right medium can make challenging material — especially content built around movement mastery — considerably easier for students to absorb. Video is one such medium: by merging sound and image into a single audio-visual package, it engages both hearing and sight simultaneously, allowing information about how a movement unfolds to come across more clearly. The expectation here was that video would help students grasp and execute the backward roll more capably(Insani et al., 2023), since repeated viewing lets them study the technique closely and sharpen their own performance over time.

At the outset (pretest stage), scores ranged from a low of 50 to a high of 79, averaging 61.69 with a standard deviation of 8, as shown below.

Table 1. Results of the backward roll learning pretest.

	Min	**Max**	**Mean**	**SD**
PRE TEST	50	79	61,69	8

Pretest results were compiled from initial assessments, then processed to gauge students' baseline standing before analysis proceeded to the frequency distribution shown next.

Table 2. Frequency distribution of backward roll learning outcomes

Interval	Kategori	Frekuensi	Presentase
>64	poor	21	65,6%
65-79	average	11	34%,4
80-100	good		
Total Data		32	100%

Rating: poor, average, good.

Following the video-based intervention, posttest scores climbed to a minimum of 62 and maximum of 86, with a mean of 74 and standard deviation of 63,8.

Table 3. Post-test Results for the Backward Roll Skill

	Min	Max	Mean	SD
POST TEST	62	86	74	63,8

The forward roll assessment data of students at SMP N 20 Padang video media was analyzed to determine the level of learning outcomes. The results of this data analysis are then illustrated in the form of the following frequency distribution table:

Table 4. Frequency Distribution of Learning Outcomes for the Backward Roll

Interval	Kategori	Frekuensi	Presentase
>64	poor	3	9,4 %
65-79	average	23	71,9 %
80-100	good	6	18,8 %
Total Data		32	100%

Based on the category results, it is known that some respondents fell into the good category, as many as 6 (18.8%), 23 respondents (71,9%) fell into the moderate category. Furthermore, only 3 of the respondents fell into the low category. It can thus be concluded that

in the posttest, students' forward roll learning outcomes showed an improvement after treatment was applied using the video-based learning media method.

Normality Test

The normality assumption check was carried out with the help of SPSS using the Shapiro-Wilk test procedure. The benchmark used is that if the significance level (p) exceeds 0.05, the data distribution is classified as normal.

Table 5. Normality Test and Shapiro-Wilk Test

	Df	**Nilai Sig.Shapiro-Wilk**	**Description**
PRE TEST	32	.486	normal
POST TEST	32	.807	normal

With pretest significance values (0.486) and posttest (0.807), both exceeding the 0.05 threshold, the normality test concludes that the data is normally distributed.

Hypothesis Testing

The data processing results show that the posttest mean score (73.56) was higher than the pretest mean score (61.69), indicating an increase in scores after the intervention. The significance of this increase is reinforced by the statistical test (paired sample t-test) with a probability value of p = 0.000, well below the significance level α = 0.05, so the null hypothesis can be rejected.

Table 6. Paired Sample T-test

	SD	t	DF	Sig. (2-tailed)	Description
Pretest-posttest	7,334	-9.159	31	.000	Ha accepted

Based on the t-test (dependent sample) to determine whether the significance value is significant, it can be seen from the (2-tailed) value of 0.05, whether it is smaller than 0.05 (0.00 < 0.05). It can also be seen that the t-calculated value was -9.159. The DF value was 31, using the formula df = n-1. With a t-table value at a significance level of 0.05 of 2.045, it can be concluded that there is a significant difference between the posttest value and the posttest value.

Table 7. Percentage increase

	Mean	**Mean Different**	**Percentage Increase**
PRE TEST	61,69	11,87	19,24%
POST TEST	73,56		

Based on the table above, there is a mean difference between the pretest and posttest scores of 11.87. From the results obtained, the average mean for the pretest and posttest, the average mean for the pretest was 61.69 and the average posttest score was 73.56, an increase of 11.87 or 19.24%. Based on these results, it can be concluded that there is a significant increase in the effect of video media in improving students' basic skills in backward roll floor gymnastics at SMP Negeri 20 Padang.

These results indicate that video media contributed positively to floor gymnastics learning outcomes, particularly for the backward roll. By presenting the movement through structured visuals, video gave students a clearer sense of what the technique should look like before they attempted it themselves — letting them observe each stage ahead of actual practice.

Thus, video media can be an alternative learning medium that helps teachers deliver movement skill material while also making it easier for students to understand and practice the backward roll technique.

On the other hand, the presence of audio and visual instruments on the YouTube platform also makes the learning process more effective and able to improve students' memory and understanding, because students can imitate without fear of falling behind on movements

they have not yet mastered, without burdening the teacher to continuously repeat movements they do not yet understand.

DISCUSSION

What distinguishes this study from much of the existing literature on instructional video in physical education is not the claim that video improves motor learning — that much is already well established — but the way the improvement is interpreted. Rather than treating the gain in backward-roll performance as a direct, standalone product of media exposure, this study frames it as the outcome of an interaction between the visual affordances of video and a set of surrounding conditions: learner motivation, psychological readiness (courage and confidence), teacher facilitation, and the learning environment. Much prior work isolates the "video effect" from these surrounding conditions; this study deliberately keeps them in view, arguing that the instructional value of video cannot be properly understood apart from the pedagogical ecosystem in which it is deployed.

Restating the core result, students who learned the backward-roll technique through video demonstrated a statistically significant gain in understanding and performance, reflected in a Sig. (2-tailed) value far below the 0.05 threshold. Practically, this confirms that showing the movement's stages visually — and allowing students to replay unclear segments — gives learners a mental template of correct execution before they attempt it physically. That matters for classroom practice: teachers rarely have time to repeat a live demonstration as many times as individual students need, and video effectively removes that constraint by letting each student control their own pace of observation.

This pattern is corroborated by several recent studies on comparable skills and settings. (H'mida et al., 2020) found that physical education students who learned a complex judo throw from continuous video outperformed peers who studied static picture sequences, with the video group also reporting lower cognitive load and higher intrinsic motivation. In a school-based gymnastics program, (Potdevin et al., 2018) similarly reported that novice children receiving video feedback improved not only in motor performance but also in self-assessment ability and motivation. More recently, (Bouzid et al., 2025) tested video feedback across an eleven-session acrobatic-gymnastics program and found substantially larger gains — in both technical scores and motivation — for the video-feedback group than for a verbal-feedback-only control group. At a broader level, the systematic review by (Mödinger et al., 2022) concluded that video-based visual feedback generally supports motor learning in school physical education, though the size of the effect depends heavily on the skill being taught and how the video is used within the lesson.

At the same time, several reviews caution against attributing improvement to video alone. (Han et al., 2022a) systematically reviewed observational learning in physical education and found that its benefits depend strongly on the model format used and on the verbal cues accompanying it, not on video exposure by itself. A companion meta-analysis by the same authors (Han et al., 2022b) reached a parallel conclusion for feedback in general: its effectiveness is contingent on delivery method and instructional context. (Zhou et al., 2021) reinforced this point, showing that augmented feedback — including video — tends to work best when combined with other pedagogical strategies rather than used in isolation. This body of evidence lines up closely with the present study's argument that motivation, psychological readiness, and teacher involvement are not peripheral variables but active ingredients in whatever effect video produces.

The convergence between this study and the cited literature is best explained by a shared cognitive mechanism: video presents an entire movement sequence continuously, which lowers the mental effort needed to imagine how one stage transitions into the next — an explanation (H'mida et al., 2020) ground in cognitive load theory and the "human movement effect" associated with mirror-neuron activation during observation of others' actions. Where the studies diverge is largely attributable to differences in context. This study involved school-age children learning a single, relatively basic floor-gymnastics skill from what appears to be a brief video exposure, whereas (Bouzid et al., 2025) tracked adolescents through an eleven-session,

ten-week acrobatic program, and (H'mida et al., 2020) tested university-level PE students on a technically demanding judo throw. Such differences in population, skill complexity, and intervention length plausibly explain why the relative weight of "surrounding" factors — motivation, anxiety, teacher role — shows up more or less prominently across studies, even though the direction of the video effect itself stays positive throughout.

The motivational dimension of the present findings is likewise consistent with a wider set of studies outside elite or specialized sport settings. (Trabelsi et al., 2022) found that secondary-school students using video modeling examples for gymnastics engaged in self-regulated learning strategies — repeated viewing, self-talk, mental rehearsal — that sustained their motivation to keep practicing without teacher or peer assistance. In elementary and university contexts respectively, (Silfia et al., 2024) and (Ali & Baig, 2022) both reported that video-based instruction raised learners' interest and motivation, which in turn was associated with better learning outcomes. (Zikri et al., 2026) reported a comparable interaction specifically in physical fitness learning, where video-based instruction and learning interest jointly predicted achievement outcomes. The consistency of this motivation–outcome link across such different educational levels — from elementary school to university, and across subject areas — lends support to treating motivation as a mediating mechanism in video-based learning rather than a confound to be controlled away.

The main contribution of this study to the field of physical education, and specifically to floor-gymnastics instruction, is an evidence-based argument against a narrow, media-centric reading of "what works" in teaching the backward roll. Instead of concluding that video alone explains the improvement observed, the study situates that improvement within a broader instructional system — media quality, students' psychological readiness to change body position safely, motivational support, and the teacher's active role in correction and staged guidance. This integrative framing addresses a gap that reviews such as (Han et al., 2022a) (Han et al., 2022b) and (Mödinger et al., 2022) have implicitly pointed toward but have not applied specifically to backward-roll instruction at the primary and secondary school level in the Indonesian context.

Several implications follow. For classroom practice, physical education teachers should treat video not as a substitute for teaching but as one tool within a larger instructional strategy — pairing it with a psychologically safe learning climate, staged guidance, and practice opportunities suited to each student's readiness. For research, these findings support further studies that formally test motivation and anxiety as mediating or moderating variables between video use and motor-skill outcomes, for example through path analysis or structural equation modeling. For educational policy, the results support continued investment in instructional technology infrastructure in schools, provided this is matched by parallel investment in teachers' pedagogical capacity to manage the motivational and psychological dimensions of skill learning — since, as the reviewed literature consistently shows, technology alone rarely accounts for the full picture. Future studies could also usefully compare expert-model versus self-model video formats and examine the optimal frequency and duration of video exposure for floor-gymnastics skills across different age groups.

CONCLUSION

Taken together, the findings support the conclusion that video-based learning media meaningfully improved students' backward roll performance at SMP Negeri 20 Padang — reflected in the rise of mean scores from 61.69 at pretest to 73.56 at posttest, a 19.24% gain, backed by a paired t-test significance value of 0.000 ($p < 0.05$) that justified rejecting the null hypothesis in favor of the alternative. Video proved useful specifically because it let students observe and revisit movement stages at their own pace, rather than relying solely on live teacher demonstrations constrained by class time. That said, this improvement wasn't attributable to video media alone — motivation, students' psychological readiness (courage and confidence), the teacher's role, the learning environment, and variation in teaching methods all played contributing roles. On balance, video-based media can be recommended as a supplementary tool for floor gymnastics instruction, particularly for backward roll material,

and offers PJOK teachers a useful reference point for designing lessons that better accommodate students' varying movement abilities.

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