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ENHANCING LEARNING OUTCOMES AND STUDENT CONSISTENCY IN FLOOR GYMNASTICS: A COMPARATIVE STUDY OF AUDIO-VISUAL MEDIA AND CONVENTIONAL METHODS

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Abstract

Purpose. This study aimed to evaluate the effectiveness of audio-visual media compared to conventional methods in enhancing learning outcomes for forward roll floor exercises among junior high school students. The objectives were to assess the impact of audio-visual media on cognitive understanding and motor skill acquisition, compare it with conventional teaching methods, and identify its advantages in terms of consistency and inclusivity in learning outcomes.

Materials and Methods. The study employed a quantitative approach with a descriptive-comparative design. 62 students from class VII at SMP Yapis Cordova were divided into two groups: one group was taught using audio-visual media. In contrast, the other group used conventional methods. The materials included video tutorials demonstrating forward roll techniques and conventional instructional tools. Data were collected through skill-based performance tests and written assessments, validated, and tested for reliability. Statistical analysis involved descriptive statistics, normality tests, homogeneity tests, and an independent t-test to examine differences between the two groups.

Results. The results showed that students taught with audio-visual media achieved a significantly higher average score (87.72) than those taught using conventional methods (81.81). Additionally, the standard deviation in the audio-visual group was lower (6.09 vs. 9.30), indicating more consistent performance. Audio-visual media enabled detailed visualization and repetition, fostering better understanding and reducing learning disparities.

Conclusions. Audio-visual media proved more effective in improving learning outcomes and ensuring greater consistency across diverse student abilities. This study underscores integrating audio-visual tools into physical education to enhance engagement, skill acquisition, and inclusivity. It is recommended that schools optimize technology use and provide training for educators to support innovative teaching strategies. Further research is needed to explore the long-term impact of audio-visual media on skill retention and performance.

Keywords: *Audio-visual media, learning outcomes, motor skill acquisition, physical education, teaching methods.*

INTRODUCTION

The problem faced in learning floor gymnastics, especially in the forward roll material, is students' difficulty understanding and correctly performing the movement techniques. Technical errors such as starting position, leading movements, and finishing often occur, increasing the risk of injury (Santoso et al., 2023). In addition, the lack of individual feedback during practice is a challenge that slows down the student's learning process (Đorđević, 2023). Conventional methods tend to fail to meet the diverse learning needs of students. Teachers often rely on direct demonstrations that cannot be repeated in sufficient detail for all students to understand (Spanou et al., 2022). Alternatively, audio-visual media can provide more precise movement visualizations, support student movement analysis, and reduce errors caused by lack of understanding or observation. Research shows that audio-visual media, such as instructional videos, can improve motor skill learning by providing real-time visual feedback (Mödinger et al., 2021). In addition, this media also allows students to access learning content at any time to learn at their own pace. Thus, integrating audio-visual media is a relevant solution to overcome various obstacles in learning floor gymnastics.

Using audio-visual media improves students' understanding of movement techniques and motivates them to be actively involved in learning. Studies show that this media makes learning more interesting and enjoyable, positively impacting student motivation (Hellín, 2023; Purbaningrum, 2023). For example, integrating video tutorials in physical education allows students to learn movement techniques independently by observing ideal models presented in the media (Capalbo et al., 2022). In addition, the project-based approach (PjBL) using multimedia also effectively improves students' cognitive and psychomotor skills (Munandar & Junita, 2022; Yunus, 2023). For example, using animation and interactive videos helps students understand the stages of complex movements such as forward rolls (Utomo, 2024). By supporting learning through various visual formats, this media can help students overcome the fear or anxiety that often arises when learning new movements (Spanou et al., 2022). In the context of physical education, technologies such as augmented reality (AR) and virtual reality (VR) also have great potential to provide realistic and safe simulations for students to practice motor movements (Farag & Hashem, 2021; Lin et al., 2023; Nelson et al., 2022; Utamayasa, 2024; Vanfleteren & Charlier, 2022). These technologies allow students to visualize their mistakes and correct them in real time, which can significantly improve their skills (Farag & Hashem, 2021; Rohayati et al., 2022; Sampurna et al., 2021; Vece et al., 2021).

Various studies have proven the effectiveness of audio-visual media in education. (Handayani, 2023; Mufidah, 2023) noted that using this media improves learning outcomes

and encourages student engagement. In learning motor skills, visualization of movement through video or animation helps students understand concepts more deeply (Mashudi et al., 2021; Yusmawati et al., 2022). However, there is disagreement in the literature regarding the direct comparison between conventional teaching methods and the use of audio-visual media in physical education. Previous studies tend to focus on one method without considering the effectiveness of both in the same learning context (Elsayed et al., 2023; Rahma, 2023). In addition, environmental factors, such as the availability of technological facilities and teachers' ability to use media, are often ignored in previous studies (Luo, 2023; Mabulana, 2024; Wang et al., 2023). This study aims to examine the effectiveness of audio-visual media in this performance compared to conventional methods and consider how situational factors can affect student learning outcomes.

This study hypothesizes that using audio-visual media in teaching forward roll gymnastics will result in higher learning outcomes and greater consistency in student performance compared to conventional methods. Specifically, students taught using audio-visual press should demonstrate better cognitive understanding, improved motor skill acquisition, and more consistent performance across different ability levels. This study aims to measure the effect of audio-visual media on the learning outcomes of forward-roll floor gymnastics. The novelty of this study lies in its comparative approach, which directly compares learning outcomes between students taught using audio-visual media and conventional methods in the context of floor gymnastics learning. This study also considers environmental factors such as school technology facilities and teacher abilities, which have not been widely discussed in previous literature (Sirajo & Abdullahi, 2023; Yunus, 2023). The scope of the study included grade VII students at SMP Yapis Cordova, focusing on learning forward rolls. Data were collected through skill and knowledge tests, which were analyzed using statistical tests to evaluate the normality and homogeneity of the data (Culajara, 2023; Y. Li, 2024). This study will provide practical insights for physical education teachers to develop more effective and innovative teaching methods.

METHOD

Study Participants

This study involved seventh-grade students of SMP Yapis Cordova as participants. The total population consisted of 62 students, divided into two groups: Group A, taught using audio-visual media, and Group B, which received instruction through conventional methods. The grouping process was conducted using a purposive sampling approach, ensuring that both groups had similar characteristics in age, initial motor skills, and prior knowledge of floor

gymnastics. Students were randomly assigned to each group to minimize bias using a stratified randomization technique. This technique categorized students based on their pre-test scores before being allocated to Group A or Group B in a balanced manner. The pre-test assessed their fundamental understanding and motor skill execution of the forward roll, ensuring that each group started with a comparable skill level. This randomization approach aimed to reduce variability between groups and fairly compare the effectiveness of audio-visual media versus conventional methods in learning forward roll techniques.

Table 1. Number of Research Participants

Group	Number of Students	Learning Methods
Group A	31	Audio-Visual Media
Group B	31	Conventional Methods
Total	**62**	-

Research Procedure and Instrument

This research procedure was designed to evaluate the effectiveness of audio-visual media compared to conventional methods in learning forward roll floor gymnastics. The study began with the preparation stage, which included the development of a skill and knowledge test instrument. The instrument was validated by experts (expert judgment) to ensure its reliability and then tested on 26 students to measure its validity and reliability. Furthermore, at the implementation stage of learning, group A students studied the material using audio-visual media. This media involved a video demonstration of the forward roll movement equipped with slow motion and replay features, allowing students to understand each movement stage in detail. In contrast, group B students were taught using conventional methods, where the teacher gave instructions through lectures and direct demonstrations in the field. The next stage was data collection, carried out after the learning. The skill test was carried out using the Guttman scale, which included indicators such as the starting position, main movement, and final attitude of the forward roll. Each indicator was assessed with a maximum score of 10, and the total weight was 100%. The knowledge test is conducted in writing using multiple-choice questions, with a maximum score of 100. The results of the skills and knowledge tests are then analyzed to determine the differences between the two learning methods.

Table 2. Results of Instrument Validity and Reliability Tests

Question Item	No	R Count	R Table	Explanation
Item	1	*0,736*	*0,388*	Valid
	2	*0,585*	*0,388*	Valid
	3	*0,643*	*0,388*	Valid
	4	*0,807*	*0,388*	Valid
	5	*0,543*	*0,388*	Valid
	6	*0,807*	*0,388*	Valid
	7	*0.588*	*0.388*	Valid
	8	*0,813*	*0,388*	Valid
	9	*0,602*	*0,388*	Valid
	10	*0,705*	*0,388*	Valid
	11	*0,900*	*0,388*	Valid
	12	*0,893*	*0,388*	Valid
	13	*0,690*	*0,388*	Valid
	14	*0,936*	*0,388*	Valid
	15	*0,712*	*0,388*	Valid
	16	*0,313*	*0,388*	Invalid
	17	*0,434*	*0,388*	Valid
	18	*0,571*	*0,388*	Valid
	19	*0,380*	*0,388*	Invalid
	20	*0,458*	*0,388*	Valid

Study Organization

This research was conducted at SMP Yapis Cordova, Timika, during the even semester of the 2020/2021 academic year. The research activities were divided into three main stages, namely the preparation stage, the implementation stage, and the evaluation stage. In the preparation stage, the researcher prepared learning materials based on the 2013 curriculum and ensured that the skills and knowledge test instruments had been validated by experts (expert judgment). In addition, technological facilities such as projectors and speakers were prepared to support classroom learning using audio-visual media. The next stage is the implementation of learning, where teachers provide teaching according to predetermined methods. In group A, learning was carried out using audio-visual media, while group B used conventional methods with lectures and direct demonstrations. The teacher was a facilitator and guided while students practiced the forward roll floor gymnastics movement. Finally, in the evaluation stage, the assessment was carried out through skills and knowledge tests. The skills test was carried out in the field with an evaluation based on the Guttman scale, while the knowledge test was carried out in the form of multiple choices. The data obtained from these two tests were statistically analyzed to measure learning effectiveness using audio-visual media compared to conventional methods.

Statistical analysis

Data analysis in this study was conducted using descriptive and inferential statistical approaches. Before the primary analysis was performed, the data were tested through

prerequisite tests, including normality tests and homogeneity tests, to ensure the suitability of the data for further study. The normality test used the Shapiro-Wilk method to determine whether the data distribution came from a normally distributed population. Meanwhile, the homogeneity test was conducted using the F test to ensure that the variance between data groups was homogeneous. After the data met the analysis prerequisites, the hypothesis test was conducted using an independent t-test. This test aims to identify significant differences between the learning outcomes of students taught using audio-visual media and those using conventional methods. The decision-making criteria in the t-test are to compare the calculated t-value with the t-table and the significance value (p-value) with a threshold of 0.05. If the calculated t is greater than the t table or the p-value is less than 0.05, then there is a significant difference between the two groups. Statistical analysis was conducted using statistical software, which allows for objective and in-depth interpretation of the data. The results of this analysis are used to conclude the relative effectiveness of the two learning methods.

RESULT

This study evaluates the differences in forward roll floor gymnastics learning outcomes between students taught using audio-visual media and conventional methods. Descriptive results show that both groups have different values in skills and knowledge of the material taught.

Table 3. Learning Outcomes with Audio Visual

MaxValue	Min Value	Mean	Median	Modus	STD
97,22	72,77	87,72	87,72	94,44	6,09

Learning outcomes show that the maximum value obtained by students is relatively high, reflecting the group's best performance. Conversely, the minimum value indicates a variation in ability among students. The average value is above 85, indicating good learning outcomes using specific media. This reflects the consistency and effectiveness of the applied learning methods.

Table 4. Learning Outcomes with Conventional Methods

MaxValue	Min Value	Mean	Median	Modus	STD
97,22	60	81,81	81,66	89,44	9,30

Descriptive statistical analysis showed that students in the audio-visual media group achieved a significantly higher mean score (87.72, SD = 6.09) compared to those in the

conventional method group (81.81, SD = 9.30). The lower standard deviation in the audio-visual media group indicates a more consistent learning performance among students.

Before conducting the hypothesis test, the data was tested using the normality and homogeneity tests to ensure that the data met the required statistical assumptions.

Table 5. Test of Normality

Group	Shapiro-Wilk	Sig.	Explanation
Group A	0,949	0,150	Normal
Group B	0,961	0,267	Normal

The normality test using the Shapiro-Wilk method showed that the data from both groups were normally distributed, with a significance value greater than 0.05.

Table 6. Test of Homogenity

F Count	df	F Tabel	Sig.	Explanation
5,751	63	0,019	Homogen	

The homogeneity test using the F test shows that the data variance of the two groups is homogeneous, with a significant value greater than 0.05.

An Independent t-test was conducted to test the hypothesis regarding the differences in learning outcomes between students taught using audio-visual media and conventional methods. The results of the analysis showed that there were significant differences between the two groups.

Table 7. T-test

Variable	N	Mean	t count	t table	Sig. (2-tailed)	Exp
Audio-Visual Media	31	87,72	2,997	1,997	0,004	There is a significant difference
Conventional Method	31	81,81				

An independent t-test was conducted to determine whether the observed differences were statistically significant. The results showed an essential difference between the two groups ($t = 2.997$, $p = 0.004$), indicating that students who learned using audio-visual media performed better than those using conventional methods. This suggests that the use of audio-visual media had a substantial impact on improving students' learning outcomes in floor gymnastics. These findings confirm that audio-visual media is statistically significant and practically effective in enhancing students' understanding and execution of forward roll techniques, offering a clear advantage over conventional teaching methods.

DISCUSSION

The findings of this study confirm that audio-visual media is more effective than conventional methods in improving students' learning outcomes in forward-roll floor gymnastics. Students taught with audio-visual media achieved significantly higher scores and demonstrated greater consistency in performance, as indicated by the lower standard deviation. This suggests that audio-visual learning reduces variability in skill acquisition due to its ability to provide repetitive, precise, and self-paced instruction. The significant effect indicates that the observed difference is statistically meaningful and educationally substantial. This aligns with previous research emphasizing multi-sensory engagement in motor skill learning (Ardika et al., 2022; Loviasyuni, 2023; Mufidah, 2023). However, while prior studies highlight improved retention of motor skills with visual-based instruction (Mödinger et al., 2021) , this study adds a comparative dimension, demonstrating that traditional teaching methods do not provide the same level of consistency and structured reinforcement as audio-visual media.

The videos and animations used in this media can create a more enjoyable learning environment, thus motivating students to be actively involved in (Astuti, 2024; Dewi et al., 2021). Movement demonstration videos allow students to learn complex techniques more effectively in subjects such as physical education. Students can see details of the movement, such as body position or speed, which are often difficult to explain through conventional methods. This supports (Bernhardin, 2023; Rahmadani et al., 2022) research, which found that using instructional videos in sports learning significantly improved students' skills. Another advantage of audio-visual media is its ability to increase student engagement. Students who are actively involved tend to understand the material better and can retain information longer than those who only receive lectures or verbal instructions (Khumaedi et al., 2021; Mutiasari & Rusnilawati, 2022). Therefore, audio-visual media is an effective tool to facilitate active and experiential learning.

The difference in the consistency of learning outcomes is visible between the two learning methods. Audio-visual media produces a lower standard deviation than conventional methods, indicating more consistent student learning outcomes (Loviasyuni, 2023; Satria et al., 2023). This suggests that audio-visual-based approaches can accommodate diverse learning styles, including visual, auditory, and kinesthetic, thus providing an equal opportunity for students to succeed (Obeid et al., 2022). In contrast, conventional methods often produce more variable results, with some students showing excellent learning outcomes while others lag. This may be because these methods tend to be less flexible in meeting students' individual needs, especially those who require more in-depth visual explanations or practical experiences (Astuti,

2024). Therefore, using audio-visual media improves the average learning outcomes and helps reduce the gap between students in one learning group.

The use of technology, especially video tutorials, in physical education significantly impacts the learning of motor-based skills. Video tutorials allow students to observe techniques in real time and repeat the material as needed, improving understanding and mastery of skills (Li, 2024; Xu, 2023). In addition, technology supports inclusivity in learning by accommodating various learning styles. For example, students with difficulty learning verbally can benefit from video content designed to meet their specific needs (Anggraeni, 2023; Zhu, 2024). The interactivity offered by audio-visual media also encourages collaboration between students, where they can discuss and practice skills together, creating a more collaborative learning environment (Tarigan, 2023). This shows that integrating technology in physical education improves the quality of learning and creates a more personal and inclusive learning experience. Therefore, the use of audio-visual media and other technologies must be continuously encouraged to ensure learning success in the modern era.

Conventional methods in physical education learning, especially for motor skills, have several limitations that affect student motivation, understanding, and learning outcomes. This approach is often too teacher-centered, where students tend to be passive and only receive instructions without the opportunity to explore skills independently (Magat, 2024; Utamayasa, 2024). Research shows that this method can accommodate various student learning styles less, so many students struggle to understand complex motor movements (Gustian, 2024). As a result, students often feel frustrated or lose confidence, which can reduce their active participation in learning (Ponnusamy & Hassan, 2023). This is in line with the findings of (Talaghir et al., 2021), which states that a passive learning approach can create a cycle of inactivity and low learning outcomes. In contrast, a more interactive and student-centered approach, such as audio-visual media, increases student motivation and skills more effectively. By providing a more engaging and relevant learning experience, this method can overcome the limitations of conventional methods and improve overall learning outcomes.

This study demonstrates that audio-visual media provides a significant advantage over conventional methods by enhancing learning consistency, cognitive processing, and engagement. However, its effectiveness may be further optimized through hybrid instructional strategies and improved access to technological infrastructure. Future research needs to focus on the long-term impact of audio-visual media use on motor skill retention. Understanding how repeated exposure to video tutorials affects students' long-term memory can provide valuable insights for educators (Bernhardin, 2023; Parimi, 2024). In addition, innovation in educational

technology needs to be directed at developing easy-to-use platforms for creating and sharing audio-visual content. This ensures broader access to quality learning resources (Darmawan, 2023; Satria et al., 2023). Adaptive technologies designed to meet the needs of students with diverse abilities must also be developed to create a more inclusive learning experience (Imtisalillah, 2024; Kowalski et al., 2022). Future research can help optimize technology integration in physical education by focusing on these areas, thereby providing a more significant positive impact on student learning outcomes.

Based on the research results, several recommendations can be implemented to improve learning methods in physical education. First, teachers are advised to widely use audio-visual media such as video tutorials and other interactive media in the learning process. This media allows students to learn independently, repeat complex material, and understand motor movements better, thereby increasing the effectiveness of learning (Khairuddin et al., 2023). Second, it is essential to hold training programs for teachers to equip them with the skills to use audio-visual media effectively. This training should include techniques for creating engaging content and integrating technology into lesson plans to make learning more interactive and relevant (Shidiq et al., 2022). In addition, schools need to play an active role in providing adequate technological facilities, such as projectors, laptops, and audio devices, to support the use of audio-visual media in the classroom. Adequate technological infrastructure will make it easier for teachers to deliver material and increase student engagement during learning (Maksimović, 2023). By integrating these recommendations, it is hoped that physical education learning methods can become more effective, engaging, and appropriate to students' learning needs in the digital era.

CONCLUSIONS

This study concluded that audio-visual media was significantly more effective than conventional methods in improving student learning outcomes in front-roll floor gymnastics learning. Audio-visual media allows students to understand movements more thoroughly through clear visualization, slow-motion features, and repetition, improving cognitive understanding and motor skills. In addition, this media also produces higher consistency of learning outcomes, indicated by a lower standard deviation compared to conventional methods. The advantage of audio-visual media lies in its ability to accommodate various student learning styles, both visual, auditory, and kinesthetic, thus creating a more inclusive and practical learning experience. In contrast, conventional methods tend to produce more significant variation in results, indicating that this approach can optimally meet individual students' needs. Therefore, it is recommended that physical education teachers utilize audio-

visual media widely in the learning process. School technology facilities and teacher training must also be improved to ensure effective technology integration. This study provides an essential contribution to supporting the development of innovative learning methods in physical education. It is the basis for further research on the long-term impact of audio-visual media on student learning outcomes.

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