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Design and implementation of audio-visual learning media for volleyball passing and serving techniques in junior high school

Indra Adi Budiman*, Ali Priyono, Endi Rustandi

Department of Physical Education, Universitas Majalengka, Jl. K H Abdul Halim No.103, Majalengka, 45418, Indonesia.

* Coressponding Author. E-mail: indra.budiman66@unma.ac.id

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Abstract: One of the main challenges in physical education learning is the limited availability of appropriate and interesting learning media for students. This research aimed to develop audio-visual learning media products in class VIII junior high school PE subjects on specific motion material for variations in upper passing, lower passing variations, upper service variations, and lower service variations in volleyball games. The research was conducted as development research adopted the Borg & Gall model: preliminary study, planning stage and initial research product development, expert validity test stage and product revision, small- and large-scale tests, effectiveness test and distribution of learning media products. Validation of learning media development is carried out by learning material experts, learning media experts, and learning media design experts. Following the expert validation of the learning content and material by subject matter experts, the validation of the learning media by media specialists, and the validation of the learning media design, further validation conducted by an online questionnaire to gather further feedback and insights. The results were obtained in the form of audio-visual learning media products that were tested to large groups receiving a validation score of 93% from learning material experts, 94% from learning media experts, and 95% from learning media design experts. For the effectiveness test, pre and post-tests on improving volleyball passing and serving skills has done and obtained the experimental class obtained a gain value of 0.62 and the control class obtained a gain value of 0.28. This research concluded that the use of audio-visual learning media in physical education showed positive results in improving understanding, motivation, and learning outcomes of volleyball games. With the right support, this media can be an effective tool to enrich the learning experience and support the achievement of physical education goals.

Keywords: learning media, audio-visual, volleyball, passing, serving, PE

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INTRODUCTION

Physical Education (PE) learning in junior high school is not a sports subject as it is understood so far and not a learning material designed only to hone students' sports skills competencies. PE is a subject that equips students with the ability to have physical fitness and skills that are useful in everyday life. It aims to enable learners to obtain changes in movement behavior, exercise behavior and healthy behavior. Physical activity is accompanied by the appropriate attitude so that the results obtained are optimal. (Roji and Eva, 2017). One of the main challenges in physical education learning is the limited availability of appropriate and interesting learning media for students. The learning media used by teachers are often only conventional, such as direct demonstrations or verbal instructions. This is sometimes unable to meet the needs of students who have different learning styles, especially for students who need a more varied visual, auditory, or kinesthetic approach. As a result, many students do not understand the concept of movement, sports skills, and have difficulty following instructions properly. Visual feedback can improve students' motor skills, especially when combined with verbal feedback.(Mödinger et al., 2022).

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In addition, the development of technology in the current digital era provides a great opportunity to create more innovative and interactive learning media. Unfortunately, the use of technology in physical education learning is still very limited. In fact, the use of technology-based learning media, such as instructional videos, interactive applications, and simulations, has the potential to increase student involvement in the learning process and strengthen their understanding of the concepts taught. Digital media can improve students' motivation and motor skills, but also identified some barriers in its implementation (Jastrow et al., 2022). On the other hand, the lack of training for teachers in developing and using appropriate learning media is also a factor that hinders the achievement of physical education goals. Teachers often do not have enough time or resources to design effective learning media that can be adjusted to the needs of students individually (Güllü & Güllü, 2019).

In practice, movement learning is designed through a number of types of physical movement/sports and health maintenance activities that are appropriate for learners. These activities are designed to get learners used to doing physical movement and exercise happily because they feel the need to do it and are aware of the importance of maintaining physical health both through physical movement and exercise and by paying attention to the health factors that affect it (Roji & Yulianti, 2017). Physical education and sports should be understood as two different things. The difference between physical education and sports can be distinguished from the aspect of activity and the aspect of the center of the material. Seen from the aspect of activity, physical education is part of education, while sports are limited to sports activities themselves. When viewed from the aspect of the center of the material (main concentration), that in sports is how a person is able to understand and practice sports techniques correctly for sports purposes (Samsudin & Subandi, 2023).

In physical education, the activities carried out by students are multilateral, meaning that they are developed proportionally starting from the upper body (upper body), middle body (torso), and lower body (lower body). Physical education seeks to develop the performance of the right and left limbs in a balanced and coordinated manner. Whereas in competitive sports only certain parts of the body according to the function of the branch are optimally developed or popularly referred to as specific (Samsudin & Subandi, 2023). Physical education and sports developed in schools through PE are child oriented, meaning that learning is oriented to the needs of students with all the differences in character. With this consideration, PE activities are designed as a process in meeting the needs of children in their daily lives. One of the learning contents of PE for class VIII junior high school in Curriculum 2013 is the game of volleyball. Volleyball as a sport that is included in this big ball game is given by the teacher in the first semester with specific motion material of upper passing variations, lower passing variations, lower service variations, and upper service variations (Roji and Eva, 2017).

Specific movements are ways of playing sports games with certain techniques with the aim of getting optimal results. There are four specific movements in volleyball games, namely down passing, up passing, spike/smash, serve, and dam (Nafisah, 2022). In accordance with the available learning materials, this study will discuss the specific movements of variations in upper passing, lower passing variations, lower service variations, and upper service variations. Lower passing is a basic technique of playing volleyball that must be mastered by players. The lower pass is useful for welcoming the service ball and then passing it to the setter to make it easier for him to pass to the smasher. The upper pass is an attempt from a volleyball player by performing certain techniques that aim to pass the ball to his own friend (Parlindungan, 2011).

A serve is a ball hit from the back of the court line beyond the net into the opponent's area. The service stroke is performed at the beginning and after an error and can also be used to start an attack (Danartikanya, 2023). There are 2 types of serves in volleyball, namely the top serve and the bottom serve. The top serve is a serve with the prefix of throwing the ball up and then hitting it towards the opponent's area. When serving up, one hand will hold the ball and throw it up, then the other hand will hit the ball by swinging the hand from top to front, until the ball is thrown into the opponent's area. While the lower service is a service with the ball starting from below with one hand holding the ball and the other hand hitting the ball. The hand in charge of hitting the ball is swung from behind to the front tightly until the ball is thrown into the opponent's area (Parlindungan, 2011).

Learning specific movements of volleyball games is still mostly done conventionally. Teachers give examples of movements, and then students follow. In today's digital era, there are many possibilities for teachers to use relevant learning media. One of them is audio-visual media whose sources are easily

available, namely through streaming videos on YouTube, Instagram, Tik-Tok and other social media. The possibility of using social media currently is more possible because people rarely use video cassettes because they are rarely produced. While carrying out their duties, teachers must understand that the learning process is a communication process. The learning process contains five communication components, teachers (communicators), learning materials, learning media, students (communicants), and learning objectives. Learning media is anything that can be used to channel messages (learning materials), so that it can stimulate students' attention, interest, thoughts, and feelings in learning activities to achieve learning goals (Gunawan & Ritonga, 2019).

Based on the problems, it is necessary to develop learning media that are in accordance with the characteristics of junior high school students, which are not only interesting, but also able to improve students' understanding, skills, and motivation in physical education learning. The learning media developed must be interactive, easily accessible, and can help teachers in delivering material more effectively. This study aims to develop innovative and effective physical education learning media, which are expected to improve the quality of learning and support the achievement of physical education learning objectives in junior high schools (Pambudi & Suharjana, 2018; Raibowo et al., 2022; Tantri et al., 2023). With the help of existing technology, it can improve students' abilities to make learning outcomes better. In addition to the use of technology, teachers who can develop their lessons with the help of technology can have a new impact on the students they teach (Nugraha et al., 2022).

Learning media in learning practice plays an important role. With relevant learning media, teachers can deliver learning materials more effectively. Learning media is also an instructional component consisting of messages, people and equipment or objects. Along with the times, knowledge and technology, learning media also experience development and progress. This means that there are many types and variations of learning media along with the times and advances in knowledge and technology. Learning media when used appropriately can help overcome the weaknesses and shortcomings of teachers in learning, both mastery of material and learning methodology (Hasan et al., 2021). The important thing to remember is the statement that no matter how sophisticated the learning media is chosen, if the material presented is not in accordance with the learning objectives, it will be useless, as well as if the content meets the learning objectives but the teacher is not skilled in designing, students will not be interested in listening (Ramli, 2012; Alti et al., 2022).

Audio-visual learning media is one of the creative products of the communication technology era that is ready to be used to assist teachers in delivering subject matter to students. The development of science has produced increasingly sophisticated technology and innovations that help human life and sometimes cause damage on earth. Significant changes to various aspects of life in the economic, socio cultural and educational fields. Hearing and viewing media (audio-visual) are learning media that uses 2 (two) five senses: hearing (audio) and vision (visual) (Hasan et al., 2021). Could audio-visual media be used for learning PE, especially learning materials for specific movements of upper passing variations, lower passing variations, lower service variations, and upper service variations? This research tries to present answers through the development of media (audio- visual) in PE learning.

The development of audio-visual based PE learning media on specific motion materials of upper passing variations, lower passing variations, lower service variations, and upper service variations is based on the idea that the use of audio-visual media can (1) help students to foster interest and motivation in the PE learning process; (2) audio-visual learning media is very suitable for use in the PE learning process both online and offline because this learning media can be played repeatedly so that the learning process can be studied outside of class hours; (3) the development of audio-visual based learning media can help PE teachers to be able to develop creative and innovative learning media.

This research on the development of audio-visual media in sports is corroborated by previous research using similar learning media, among others: (1) the audio-visual based PE learning media on basketball shooting material (Pranata et al., 2021); (2) audio-visual media as an effective solution for motor learning (Sumarsono & Anisa, 2019). Meanwhile, research on volleyball itself has been conducted by Budiman (2016) which examines the development of a spike model in the game of volleyball; and Parlindungan (2011) which examines passing training in the game of volleyball.

The development of information and communication technology has had a significant impact on various aspects of life, including in the field of education (Jastrow et al., 2022). One innovation that has been widely applied is the use of audio-visual media in the learning process. In the context of physical education, audio-visual media offers an effective new way to overcome various challenges in teaching

and learning (Raibowo et al., 2022). PE as an integral part of the school curriculum aims to improve physical fitness, motor skills, and health awareness of students (Gross & Buchanan, 2011). However, the implementation of physical education often faces various obstacles, such as time constraints, lack of resources, and the need to present material in an interesting and easy-to-understand way. Increasing the role of audio-visual media is very important (Battaglia et al., 2019)

Audio-visual media includes various forms of material, such as video, animation, graphics, and sound recordings, which can present information in a more dynamic and interesting way than traditional methods. By utilizing this media, instructors can provide clear visual enhancements of sports techniques, fitness principles, and other physical activities that are difficult to convey only through verbal explanations or statistical images. Research shows that audio-visual media can increase student engagement, improve understanding of the material, and motivate students to actively participate in learning activities. Impressive videos, for example, allow students to see techniques firsthand, while animations can explain complex concepts in a simpler and more engaging way (Raibowo et al., 2022). In addition, these media also provide errors in the delivery of material that allows students to learn at their own pace and access materials outside of class hours. With this background, this article aims to explore the role and effectiveness of audio-visual media in physical education learning. The main focus will be placed on how this media can be used to improve the quality of learning, as well as the challenges and opportunities associated with its application in the context of physical education in schools. Through a deep understanding of the contribution of audio-visual media, it is hoped that valuable insights can be obtained for the development of more effective and innovative teaching methods in the future (Güllü & Güllü, 2019). It is hoped that this development research will be useful for improving the learning performance of PE teachers.

METHODS

As a learning media development study, researchers used the Borg & Gall research model with modifications (Borg & Gall, 1983; Maydiantoro, 2021; Dewi, 2022): (1) preliminary study, (2) planning stage and initial research product development, (3) expert validity test stage and product revision, (4) small- and large-scale tests, (5) effectiveness test and distribution of learning media products (Budiman, 2016). Of the ten stages of Borg & Gall development research, only five steps were used for this research. Borg and Gall's full development research is quite time consuming, especially since it involves several cycles of testing and revision. In the context of academic research, time constraints are a major factor that make researchers only able to carry out a portion of the stages. Therefore, the stages selected are the most relevant and critical to achieving the product development goals efficiently. Since this research is conducted in an academic setting, the scale of product development and testing is often limited. This research was conducted only at one school. Thus, some stages such as "operational field testing" which is usually carried out on a large scale, may not be relevant and can be skipped without reducing the value of the research. Full-scale product development requires large resources, including costs, manpower, and equipment. Using only five stages allows researchers to focus on the core stages that can be carried out with the available resources, such as initial testing, revision, and limited field testing, without having to conduct wider dissemination or operational testing. If the main goal of the research is to produce and test a product in its initial form, then the first five stages (e.g., preliminary research, planning, prototype development, initial testing, and product revision) are sufficient to achieve the desired results. Further stages, such as large-scale testing or dissemination, may be performed in follow-up research or larger development projects. The use of Borg and Gall's five stages is more realistic and appropriate to the scale of academic research, where large-scale measurement or product dissemination may be beyond the scope of academic research, which places more emphasis on concept development, early validation, and limited testing.

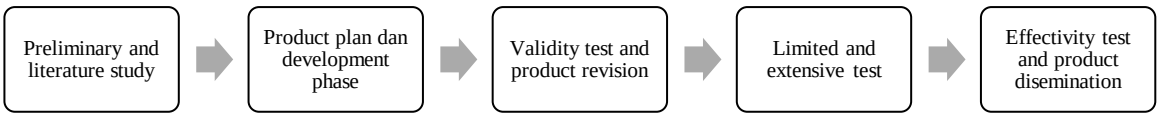

Figure 1. Borg and Gall Development Five Phase with Modification

Data was collected through data in the field by involving several experts who were authorized to make product validation. The data obtained was then developed into a description narrative as a qualitative descriptive analysis technique. The decision-making process for product validity is guided by the provisions outlined in Table 1.

Tabel 1. Scale Conversion in Product Validity Score

Score	Category	Action
90 – 100	Very good	No need to revise
76 – 90	Good	No need to revise
66 – 75	Simply	Product Revision
56 – 65	Less	Product Revision
1 – 55	Very Less	Reiterate

RESULT AND DISCUSSION

PE learning on specific motion material for variations of upper passing, lower passing, upper service, and lower service using audio-visual learning media is carried out through (1) the preliminary study stage (initial data collection), (2) the development planning stage, (3) the media product development stage, (4) the expert validity test stage and product revision (5) the validation stage and the distribution of learning media products. This stage is in accordance with the stages of Borg & Gall development research (Maydiantoro, 2019; Dewi, 2022).

To collect initial data, observations and interviews with students and teachers were conducted. The data collected was about learning materials, difficulties when following learning, and obstacles faced by teachers when providing subject matter. Based on the initial data, the researcher got an overview of the problems faced, one of which was the boredom of students in participating in learning. Most students didn't follow the teacher's instructions to imitate specific movements according to directions and often make mistakes. The development planning was carried out by drafted an audio-visual learning media script, consisting of an outline of video content and preparation of material descriptions. Product development was carried out, then the manufactured of media. The process of making media begins with the preparation of Basic Competencies (BC), formulation of BC indicators, determining material, collecting related videos, then developed through animation in accordance with the material: upper passing variations, lower passing variations, lower serves, and upper serves in volleyball games.

The validation stage was carried out by 3 experts (material expert, learning media expert, and learning media design expert). The validation results can be seen in Table 2.

Table 2: Expert Validation Results

Expert	Percentage	Qualification
Learning Material Expert	92%	Very Good
Learning Media Expert	91%	Very Good
Learning Media Design Expert	91%	Very Good

Table 1 shows that learning material experts provide validation scores in the range of 92%. Notes on the validator emphasize (1) improvement of hand position when performing upper passing and lower passing, as well as upper serving and lower serving, (2) foot position when passing, so as to produce a good bait to be fed back or hit by the smasher, (3) The validator provides suggestions that the concept / draft is given an explanation of the type of material and specific motion parts that will be presented. From learning media experts, 91% validation results were obtained, along with several suggestions, including: (1) Impressions of specific movements of upper passing and lower passing should be emphasized, so that students can imitate them well; (2) Each specific movement should be given a narrative or explanatory text. The results of the validator assessment from the learning media design expert were 91%. The suggestions he gave were: (1) taking pictures should use a tripod, if the pictures are taken directly from the recording; (2) if the pictures are taken from download streaming, good quality pictures should be selected.

The next stage is product validation and dissemination. In this case, validation was carried out by the three experts through a small group and large group trial. The small group trial validation scores can be seen in Table 3.

Table 3: Results of Expert Validation on Small Group Trial

Expert	Percentage	Qualification
Learning Material Expert	92%	Very Good
Learning Media Expert	93%	Very Good
Learning Media Design Expert	93%	Very Good

The three expert validators gave very good qualifications with details of (1) learning material experts gave a percentage value of 92%; (2) learning media experts gave a value of 93%; and (3) learning media design experts gave a value of 93%. At this stage there are no more suggestions for improvement from the three experts, so that the development of audio-visual learning media for specific motion material for upper passing variations, lower passing variations, upper service variations, and lower service variations is good enough to improve movement skills for class VIII junior high school students.

As a final step, a large group test was conducted to confirm whether the media development could be disseminated to a wider audience. The results of the large group test showed in Table 4.

Table 4: Results of Expert Validation on Large Group Trial

Expert	Percentage	Qualification
Learning Material Expert	93%	Very Good
Learning Media Expert	94%	Very Good
Learning Media Design Expert	95%	Very Good

It turns out that the large group trial of the use of audio-visual media for learning PE is as shown in the Table 4. These results prove that audio-visual learning media on specific motion material for upper passing variations, lower passing variations, upper service variations, and lower service variations are good enough to improve movement skills for Class VIII junior high school students and deserve to be distributed to a wider audience.

Tabel 5. Results of calculating the effectiveness of Volleyball skills with Gain Score

Material	Group	Gain Score	Category	Decision
Passing	Eksperiment	0,77778	High	Effective
	Control	0,38235	Moderate	Less Effective
Service	Eksperiment	0,5	Moderate	Quite Effective
	Control	0,25	Low	Not Effective

The results of the calculation of the effectiveness test on improving student learning outcomes in each class provide a decision that the experimental group is more effective than the control group (see Table 5). In all gain score calculations, the experimental group gets a better category than the control group. So overall, from the underhand passing and service skills, the experimental group using audio-visual learning media is more effective than the control group using student textbook learning media in improving the learning outcomes of 7th grade junior high school students in the form of underhand passing and service skills. Overall, the use of audio-visual learning media in physical education shows positive results in improving students' understanding, motivation, and learning outcomes. With the right support, this media can be an effective tool to enrich the learning experience and support the achievement of physical education goals. Hopefully, this conclusion can provide a clear picture of the positive impact of audio-visual media in the context of physical education learning.

The development of audio-visual media on specific motion materials of upper passing variations, lower passing variations, upper service variations, and lower service variations is one of the teacher's efforts in innovating education. Educational innovation includes matters related to the components of the education system, both in a narrow sense (the level of educational institutions), and in a broad sense

(the national education system). Innovation in education can be product or system, for example, a teacher creates learning media (Ramadhan, 2022). The use of media in learning can help children in providing meaningful experiences for students. The use of media in learning can make it easier for students to understand something abstract to be more concrete (Kristanto, 2016). The audio-visual education programs that children showed positive were used in audio-visual education programs contribute to increase physical activity levels by affecting the children's intrinsic motivations. The audio-visual education programs may contribute to increase physical activity levels by affecting the children's intrinsic motivations. Also, the family played an effective role in physical activity trends, and therefore, increased the inner motivation of the child, and caused the negative behaviors to be positively changed (Güllü & Güllü, 2019).

One of the products of educational innovation is learning media, one of the factors that play an important role in the learning and teaching process. In learning, teachers usually use learning media as an intermediary in delivering material so that it can be understood by students (Wulandari et al., 2023). For the learning atmosphere to remain enthusiastic, it requires several interesting, effective, and efficient supporting media that are able to convey messages from educators to students (Hasan et al., 2021). Learning media, which contain information and knowledge, are generally used to make the learning process more effective and efficient. In addition, learning media also makes learning activities more interesting so that it can increase students' learning motivation (Samsudin & Subandi, 2023). The use of media is an inseparable part in the process of teaching and learning activities. Moreover, every learning process wants effective and efficient results and maximum results (benchmarking), so the media element cannot be denied or ignored (Hasan et al., 2021). Technology is an important part of education because it can be used to improve the quality of learning and solve problems that arise. The presence of technology in everyday life has made it an inseparable aspect in various fields, including social, educational, professional, and religious. Religious learning can provide very beneficial learning opportunities for students and can improve their cognitive abilities (Adi & Fathoni, 2020). Therefore, to improve the quality of education in the fields of science and technology, the use of technology is becoming increasingly important along with the times (Raibowo et al., 2022).

PE is a learning process through physical activities designed to improve physical fitness, develop motor skills, knowledge and behavior of healthy and active living, sportsmanship, and emotional intelligence (Samsudin & Subandi, 2023). In order for PE learning material to run well and interestingly, relevant learning media is needed, including multimedia. Audio-visual learning media as one of the multimedia products today is so popular, because it can present information more interestingly to students (Pranata et al., 2021). Audio-visual learning media is learning media that presents audio and visual elements simultaneously so that students get messages or information from visualization in the form of words or images that are complemented by sound (Pagarra et al., 2022). Educational resources that incorporate technology serve not only as instructional aids but also as cognitive stimuli to facilitate the transformation of abstract knowledge into concrete experiences that are directly observable. Learners may find it more challenging to comprehend abstract concepts compared to tangible ones (Raibowo et al., 2022). The media employed should be efficient in stimulating interest and enhancing student motivation for learning. It is essential to incorporate advanced technological and scientific tools to support teachers in stimulating student motivation for learning. The findings of the study suggest that the utilization of highly effective instructional media by teachers during the educational process can significantly influence students' academic performance (Bima et al., 2021). Hence, the efficacy of educational media can be gauged through the learning results demonstrated by students. However, in addition to learning objectives, student feedback provided during the learning process also demonstrates the media's efficacy (Tantri et al., 2023).

Audio-visual media is media that can present moving images, colors and accompanied by explanations in the form of writing and sound. The use of audio-visual media in the learning process is one of the plans that a teacher has prepared to make the learning process more interesting and can motivate students to learn (Ichsan et al., 2021). Audio-visual learning media is good for use in delivering learning materials contained in PE subjects. Audio-visual learning media is a medium that can be seen and heard by students. The word audio is a sound that can be heard by humans while visual is an image that can be seen by the eye. The combination of audio-visual is a medium that can be seen and heard by students (Sumarsono & Anisa, 2018). What is heard and seen is related to one another and reinforces each other or what is known as integrated. This media presentation will be very helpful, among others,

in addition to getting information from hearing, learners can also use their vision which can strengthen the information they hear (Anwar et al., 2022). Audio-visual media is believed and trusted to be more able to excite the interest of students, because of its own nature which is easy to pack and attracts students to follow with a happy atmosphere (Pranata et al., 2021).

In this study, different media were used during the pretest and posttest, so that there was a difference in test results that increased after applying audio-visual media to the post-test results on passing and serving skills in volleyball. The media in the control group used student textbooks that were usually used by PE teachers in physical education learning. While the experimental group used audio-visual media focusing on motion analysis that could be followed by test participants, junior high school students, so that during the posttest many participants could follow each movement flow carried out by the demonstrator in the video tutorial that was already available. That way, technically, participants have been helped multisensory, from sight and hearing in a complex and detailed manner. This is in line with the theory that says that multisensory from learning media can provide opportunities for students to develop motor potential optimally (Hariadi et al., 2020; Kurniawan et al., 2021).

Previous research on the application of audio-visual media in learning shows how audio-visual media is quite capable of helping teachers in carrying out their duties in providing learning. Among them are: (1) Pranata et al., (2021) concluded that audio-visual-based PE learning media is suitable for use in the learning process; (2) Rizal, Kurniawan, (2014) stated that the application of audio-visual media greatly affects learning outcomes; (3) Sumarsono & Anisa, (2019) provides a concluding statement that audio-visual media is an effective solution in learning and teaching motion skills. (4) Ichsan et al., (2021) provides an overview that audio-visual media because this media has more capabilities by relying on two senses at once, namely the sense of hearing and the sense of sight. With this media, it is hoped that it can generate motivation in learning and clarify the material conveyed by the teacher.

CONCLUSION

In conclusion, the design and implementation of the audio-visual learning media for volleyball passing and serving techniques in junior high schools have been successfully developed and proven to be effective. The media has demonstrated a significant improvement in students' passing skills, enhancing their ability to execute precise and accurate passes. While the media has also shown to be quite effective in improving serving techniques, further refinement is needed to optimize its impact on this specific skill. Overall, the audio-visual learning media has been a valuable tool in enhancing the instructional quality of volleyball training in junior high schools, contributing to better skill acquisition and improved performance among students. Future research should focus on continuous evaluation and enhancement of the media to ensure its long-term effectiveness. It also could be conducted to test the effectiveness of audio-visual learning media on students of different ages. Further trials could be conducted in school contexts with different facilities and socio-economic backgrounds. Research could focus on students with different learning styles (visual, auditory, kinesthetic) to see if audio-visual media are more suitable for certain groups. Further research could explore the use of newer technologies such as virtual reality (VR) in physical education. VR has the potential to provide a more immersive learning experience and may improve students' motor skills and understanding of sports movement concepts. Long-term studies are needed to assess whether the use of audio-visual media has a lasting impact on students' physical skill development, including its impact on students' motivation to participate in physical activity outside of school hours.

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