

Learning media as a solution to increase knowledge and abilities in students

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Abstract

The selection of appropriate learning media is proven to have a positive impact on students' knowledge and abilities in the learning process. They were referring to material in learning carried out by sports students as one of the preparations for teachers who must understand refereeing regulations so that the entire learning process can really utilize learning media. This study aims to determine the effect of the application of learning media on remembering the knowledge and ability of volleyball referees. The research method used in this study is quasi-experiment with a pretest and posttest quasi-experimental control group research design. This study involved 30 volleyball referee students who were obtained using cluster random sampling. This research instrument is an instrument that uses a questionnaire on the level of knowledge and ability of volleyball referees, divided into 10 indicators. This questionnaire obtained a reliability of 0.826. The analysis of this data used prerequisite tests (normality test using the Kolmogorov Smirnov test, homogeneity test using the Levin statistical test), and a t-test conducted with the help of SPSS 25 to test the effect on each subject. The results showed that the average score of the experimental volleyball referee group was 216.93 ± 7.75 , while the average score of the control volleyball referee knowledge and ability level group was 189.47 ± 7.18 , the experimental group was better than the control group.

Keywords: Volleyball, referee, knowledge, ability.

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INTRODUCTIONS

In order to accomplish learning objectives, instructors and students engage in the learning process. As educators, teachers decide whether or not

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learning objectives are met because, in addition to imparting knowledge, they also have to be able to mentor students as they change and mature psychologically, physically, and emotionally. In order for pupils to learn effectively and retain the information that is presented to them, teachers must be able to create a pleasant environment for both teaching and learning activities (Pratiwi, 2020). Considering their immense duty, educators need to be cognisant of their roles as educators, implementers of education, and leaders of successful learning environments. According to Husain et al. (2015), including instructional media in the process of teaching and learning can inspire students to pursue new interests and aspirations and provide motivation for their work. The learning process, which must be well thought out and executed in order for the learning objectives to be met, is the means by which pupils are developed through the utilization of the learning process. Learning is a step of purposeful information acquisition that happens throughout life, and it is intimately linked to the learning process (Pambudi et al., 2019). Learning is the mental process of changing one's perspective through experiences that alter certain facets of one's personality (Husain et al., 2015; Widiyatmoko & Hudah, 2017). A better behavior improvement in students is an indication that they have learned. These modifications to behavior take the shape of emotional (attitude), psychomotor (skills), and cognitive (knowledge) alterations.

In the process of learning, teachers are crucial. In addition to imparting knowledge and comprehension of the subject matter, teachers today also need to be capable of providing character education to their students and be aware of the aspects of learning that are supported by media and learning models that help students reach their full potential (Cereda, 2023; Gravett & van der Merwe, 2023). When teachers use their creativity in conjunction with effective learning designs, students will always learn more effectively and become masters of the content. The foundation of education in schools is learning activities, particularly physical education.

Physical education aims to enhance motor skills, spiritual growth, and physical development (Putra et al., 2019). In order to get the best possible learning outcomes for all learning activities that involve physical activity, physical education is crucial to the educational process (Gravett & van der Merwe, 2023). Physical education can be defined as a planned, organized, and well-designed physical activity aimed at enhancing the qualities of persons (Culajara, 2022). One of the curriculum subjects that transfer to university education is volleyball refereeing, which is taught in physical education classes.

In addition to the psychomotor domain, the cognitive and affective domains are also highly significant in physical education learning. The basic concepts covered in physical education instruction must be reflected in the physical education learning materials utilized in the teaching and learning process. Referencing content for teachers to students is the primary function of the material offered in physical education, and it serves as the starting point for creating or modifying learning media. The best learning objectives can be met when teachers select the appropriate learning materials (Husain et al., 2015). The educators in charge of the service must be informed of the creation of instructional media.

In order for aspiring teachers to understand the intricacies of sports, they must be exposed to refereeing material during physical education classes (Darling-Hammond et al., 2020; Gravett & van der Merwe, 2023). Football, swimming, basketball, athletics, volleyball, and other sports are among them. Nonetheless, the issue that students face is that they need help understanding certain volleyball regulations, according to the findings of the researcher's preliminary observations on the volleyball refereeing learning process in physical education majors. It will have an impact on student learning results. Students' ability to learn volleyball refereeing material is impacted by their need for more proficiency with the rules. Additionally, the researcher spoke with the concerned students through interviews, and the results showed that more innovative teaching tools were required to teach reference material.

The author is motivated to investigate the application of learning media in the learning process of refereeing material in an effort to improve knowledge and abilities in volleyball refereeing material because there is a great demand on physical education teachers to be able to think, plan, and use learning media in the process of providing refereeing material to physical education students. Given that learning media is one of the options that can be employed as a material interpretation in the learning process, the study's findings would help students grasp physical education learning materials. According to research by [Septiana and Kurnia \(2020\)](#), students' comprehension of the physical education learning process can be enhanced by using learning media in the classroom. The study's findings of [Rahmawati and Mukminan \(2018\)](#) strongly encourage students' learning objectives and independence. The study's findings by [Pranata et al. \(2021\)](#) demonstrate that using learning media in the classroom is doable.

The author of this study will offer learning resources that incorporate a variety of media, such as text, audio, graphics, and video. These components work together to create a reciprocal interaction between the educational materials by enabling users to direct commands and be more participatory. Field facilities, equipment, communication, attention and understanding, easy coordination, competitive performance and professionalism, constancy, suggestions for referee responses, game signals and attitude, and referee constancy are indicators of students' mastery of skills and knowledge of refereeing material. To find out this, the researcher offers a questionnaire grid measurement test of volleyball referees' level of knowledge and ability.

METHOD

In this study, the design of the pretest and posttest quasi-experimental control group was used to investigate the possible cause-and-effect relationship and try the treatment of the experimental group ([Sugiyono, 2022](#)). This test was given to two experimental groups involved in the study. This

research involved 30 volleyball referee students. A random sample cluster was used for this study. Researchers randomize people to form one group for the experiment and another for the control class. The study involved 15 subjects in two groups: the control group and the free group.

This study divided the instruments used to assess students' knowledge and abilities about volleyball refereeing material into ten indicators. These indicators include field facilities, equipment, communication, attention and understanding, easy coordination, competitive performance and professionalism, constancy, suggestions for referee responses, game signals, and referee attitudes and constancy (Suharta et al., 2022). Table 1 shows a questionnaire grid about students' level of knowledge and ability about volleyball refereeing materials. The questionnaire assessment scale used four interval assessment options from the data results. The reliability of the survey was 0.826. Based on the table of guidelines for interpreting correlation coefficients (Sugiyono, 2022), the value of 0.826 indicates that this survey is included in the very good category. Therefore, the social skills questionnaire that was created was very reliable.

The research consists of stages and a flow. This research was carried out in three main stages. The initial stage is testing. The initial test was conducted to assess students' knowledge and abilities in volleyball refereeing material on a sample. Furthermore, questionnaires were distributed to collect information about students' knowledge and abilities in volleyball refereeing material. Treatment is the second stage. According to the study results, the control group of students received the intervention of volleyball referee material using multimedia-based teaching materials, while the control group learned volleyball referee material with conventional teaching materials for thirteen meetings. As this study shows, the level of knowledge of volleyball referees about their philosophy and role in the game is relative. The third stage is the final examination. The last test is done after the treatment is complete. In the posttest activities, students are tested on their knowledge and abilities about

volleyball refereeing materials. The purpose of this final test is to find out if the student has improved after being treated with volleyball refereeing material. Data collection in this study was done using a questionnaire instrument with four interval assessment options from the data results. The reliability of the survey is 0.826. This instrument was developed and carried out based on the results of [Sujarwo and Margono. \(2023\)](#) research to see volleyball referees' level of knowledge and skills

The data obtained were subjected to statistical tests. These include prerequisite tests (normality test with the Kolmogorov Smirnov test or homogeneity test with the Levin statistical test) and hypothesis tests with the t-test used with SPSS 25.

Table 1. Questionnaire grid of the level of knowledge and ability of volleyball referees

No	Material/Learning focus
1	The philosophy of a referee in a volleyball match is.....
2	In order for the referee to lead a volleyball match and make better decisions, he should always bring...
3	Some of the obstacles faced by a volleyball referee in leading and making decisions in a match, except.....
4	The wrong referee's decision will have an impact on...
5	When making decisions in a match, the referee should consider the following...
6	Some of the following things should not be done by the referee, except...
7	The attitude that should be built by the referee with the coach, athletes, and everyone involved in the volleyball match is as follows, except...
8	It is also necessary to realize that referees are also ordinary humans; of course, they have experienced mistakes like humans in general, but after apologizing and also being corrected and evaluated by the referee board (SRC), they should...
9	A team, through the captain and also the coach, can give input or protest to the referee leadership in a good way, namely...
10	The referee's license is in order from the lower level.

RESULTS

The results of the volleyball referee knowledge and ability pretest are shown here. The test consisted of ten questions arranged using the instruments used in data collection, with four alternative answer choices, and each question was given a score of ten points. The total score of the exam is 100 if the referee answers all the questions correctly. A test of a volleyball referee's knowledge and ability to officiate matches had never been conducted before this research activity. The following table 2 shows the results of the 30 referees who answered the Google form:

Table 2. Results of the questionnaire answers to the level of knowledge and ability of volleyball referees

No	pretest		posttest	
	Experiments	Control	Experiments	Control
1	70	70	90	88
2	70	65	90	85.2
3	72	67.5	89	84.4
4	75	65	89	81.9
5	76	68.5	90	81.7
6	70	71	90	83
7	70	70	90	81.3
8	72	65.5	91	83.3
9	70	71.5	91	81.3
10	72	60	91	80
	73.6	70.17	90,1	83,67

From the results of the table above, it is concluded that the average score of the group between the pretest and the posttest is different, in the pretest, the experimental group gets the highest average (73.6), while the control group (70.17) while in the posttest group the experimental group gets the highest average (90.1), while the control group (83.67) means that judging from these results the experimental group gets the best results, but when viewed from the results of the control group the average score very thin. The comparison between the pretest and the posttest showed that the experimental group experienced a greater increase in scores than the control group. In the pretest, the experimental group already had the highest average score (73.6) compared to the control group (70.17). After the intervention, the increase in the average score in the experimental group was higher, reaching 90.1, while the control group reached 83.67. Although the difference in scores on the different posttests was pretty close, the experimental group still showed better results overall.

Table 3. Results of the level of knowledge and ability of volleyball referees in the experimental group

Category	interval	Frequency	Percentage
Very High	81-100	10	100%
High	61-80	0	0
Moderate	41-60	0	0
Low	21-40	0	0
			100%

The study results show that volleyball referees' knowledge and ability are divided into 4 levels. One of the experimental groups, with 10 participants or 100% frequency, received a very high outcome category.

Table 4. Results of the level of knowledge and ability of volleyball referees in the control group

Category	interval	Frequency	Percentage
Very High	81-100	9	90%
High	61-80	1	10%
Moderate	41-60	0	0
Low	21-40	0	0
			100%

The study's results show that volleyball referees' knowledge and ability are categorized into four levels. Nine people in the very high control group received 90% of the study results, one person in the very high control group received 10% of the study results, and none entered the medium or low category. According to the normality test results using the Kolmogorov-Smirnov test ($p > 0.05$), both the experimental volleyball referee knowledge and ability groups and the control group showed normal data distribution.

Table 5. Normality test calculation

Variable	Kolmogorov-Smirnov ^a	Probability	Information
Experiment Group	0.832	>0.05	Normal
Control Group	0.723	>0.05	Normal

In addition, the findings of the variance test in Table 4 show the homogeneity of variance ($p > 0.05$). This shows that the level of knowledge and ability of volleyball referees in the control and experimental groups have the same variance. These results validate the assumption about the homogeneity

of variance in statistical analysis, suggesting that the two groups' variation is not statistically different. As a result, the group's ability to meet the assumptions of important statistical analysis increases the dependence on the interpretation of the study results. The normality results showed that the extreme values did not significantly skew the data, and the homogeneity of the variance showed that the change between groups was due to the effect of the treatment rather than the variation of the basic variance. If this assumption is met, confidence in the results of the statistical analysis of this study will increase.

Table 6. Independent sample t-test results

Variable	N	$\bar{x} \pm Sd$	Significant	Sign.
Experiment Group	15	187.67 \pm 6.32	0.00	0.05
Control Group	15	142.32 \pm 6.08	0.00	0.05

The results of the t-test independent sample between the knowledge level and ability group of the experimental volleyball referee and the control group are shown in Table 6. The average score of the experimental group was 216.93 ± 7.75 , while the control group had an average score of 189.47 ± 7.18 , each with a significance score of 0.00 (< 0.05). This supports the study's results, which show a significant difference in volleyball refereeing knowledge and ability between the experimental group of students and the control group.

DISCUSSION

The results showed significant differences in the knowledge and ability of volleyball referees between the student experimental group and the control group. So, learning media can have a positive impact on improving physical education knowledge and learning ability, especially volleyball learning materials for physical education students. Based on the assessment results obtained from the test observations in both groups, the data was then analyzed using a formula to find the mean and calculate the percentage for each component. The graph below shows the data and results of the analysis of the ability of student referees who learn to use conventional and multimedia-based teaching materials.

The experimental group outperformed the control group, as can be seen from all the indicators in the diagram above. Learning with multimedia teaching materials makes students more active in independent and classical learning, improving the experimental group's understanding and refereeing ability. Students can directly experience cases and seek information with their group based on the cases given and the sources they find themselves to solve them (Li, 2016). Students are then given the task of practicing and trying everything they see during learning. Students will gain new experiences through this activity, and from this experience, guidance efforts will be made through observation and interviews to find relevant knowledge, movements, and information. Based on the research results and discussion above, multimedia-based teaching materials are a new experience where students can create new perceptions of what will happen, mistakes, and inadequacies. Thus, the knowledge students gain from the existing subject matter can be used as reflection material to correct their shortcomings in defending volleyball matches.

Using computer-based learning media affects students' interest in learning the competencies that will be given (Kasih et al., 2023). Learning media is everything that is used to convey information or material in all forms of activities. In physical education, there is a wide variety of learning media available, from the most basic and affordable to the most complex and costly. As a result, media usage needs to be optimized. This is one of the elements that greatly aids in the learning process, along with the usage of audio-visual and picture media. Students will benefit immensely from the learning media as they progress through the physical education curriculum. The results show that volleyball refereeing students can improve their knowledge and ability of volleyball refereeing by applying multimedia learning with various approaches. Multimedia is a collection of media and computer-based communication systems that can create, store, send, and receive information in various formats, such as tasks, graphs, audio, video, etc (Samsuddin et al., 2022).

Multimedia is a combination of various communication channels to create an organized communication experience where there is no integrated cross-language channel interpretation (Yang, 2023). However, Parente et al. (2020) state that two-way communication is at the heart of interactive multimedia.

Learning through media can be used to improve volleyball knowledge and skills. There are various media learning techniques, such as motion audio-visual media, silent audio-visual media, semi-motion audio-visual media, and print media. These techniques offer interesting learning models and can be used in the learning process, especially in learning about volleyball.

Multimedia learning is one of the alternatives to learning that can be done anywhere and anytime (Tang, 2011). The concept of multimedia learning will be suitable for subjects in schools, including Physical Education, Sports, and Health, because in the process, learning media is needed to make the material easier for students to understand.

Interactive multimedia can build a multisensory environment that supports certain learning approaches, according to Leser et al. (2011). As such, multimedia can function in education in three ways: (a) as an instructional aid, (b) as interactive tutorials, such as simulations, and (c) as a source of learning instructions, such as storing a series of microscope slides or radiographs.

In the process of teaching and learning, media is defined as a graphic, photographic, or electronic tool to collect, process, and rearrange visual or verbal information (Santoso et al., 2021). In terms of media forms, academics have stated its various forms. These include the use, characteristics of the media, the learning experience of the students, and its reach, as well as the type and form of media (Kevin et al., 2015). The study is limited to sample size or concentrated on specific features, which can affect how widely the results can be used. Although this study supports the level of knowledge and ability of volleyball referees through multimedia-based teaching materials, and the control group is students who learn volleyball game referee materials with conventional teaching materials, there are several interpretations that can

consider the impact of other factors or differences in approaches. Subsequent studies may examine the long-term impact of different approaches.

CONCLUSION

Based on the research results and discussion of the above research, there are two conclusions in this study, namely that multimedia-based teaching materials can be applied in volleyball referee learning, and these teaching materials are effective in increasing the productivity of student learning outcomes in volleyball referee materials. The implication that can be conveyed in this study is that using learning media has an influence on the ability and skills of volleyball refereeing material so that, in the future, it can be applied to other materials in the scope of physical education learning. Further research can use other approaches or improvisation in learning media to support students' learning success.

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