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THE USE OF MULTIMEDIA FOR LEARNING BADMINTON

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Abstract
This study aims to develop a multimedia-based learning model of badminton theory and practice. The method used in this research is research and development with 10 steps Borg & Gall. The subjects consisted of 3 experts (badminton, learning, multimedia) and 150 students at three universities that have sports science faculties in West Java. Based on the results of expert validation, the product developed is suitable for use and has been proven to be effective in improving students' badminton skills. Based on the Paired Sample Test, it can be seen that only two Control groups (B and C) have Sig values. (2-Tailed) is more than 0.05 (2-tailed> 0.05) so that in this result it can be stated that Ho is accepted and Ha is rejected, which means that in control groups (B and C) there is no difference in the average initial test scores with the final test. Thus, it can be stated that there is no effect of treatment on improving student badminton learning outcomes. Meanwhile, Pired 1, 4, 5, and 6 (four groups) have Sig values. (2-Tailed) is less than 0.05 (Sig. (2-Tailed) <0.05) so that in this result it can be stated that Ho is rejected and Ha is accepted, which means that there is a difference in the results of the initial test and the final test. Thus, it can be stated that there is an effect of treatment on improving student badminton learning outcomes. Based on the Equal variances assumed section values it is known as Sig. (2-tailed) is 0.039 <0.05, thus Ho is rejected and Ha is accepted, which means that there is a difference in the average test results of the control group and the experimental group. Based on the statistical results of the T test, it can be seen that between the control group and the experimental group there is a significant difference in the results of the final test. This shows that the developed model which was implemented as a treatment for the experimental group, hasa better effect than the control group. However, in the control group, of the three groups, there was one group whose paired t test results showed a significant difference between the initial test and the final test. This is something that is beyond the prediction of the researcher, because there are other factors that may influence this achievement outside the variables studied.

Keywords: *Badminton; learning; multimedia*

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INTRODUCTION

Technology has a very important role in the educational process and helps to provide direction in the developmentof the world of education. In the history of educational development, information technology is part of the media used to convey the message of knowledge to people, starting from the printing technology of several centuries ago, such as printed books, to telecommunications media such as sound recorded on cassettes, videos, televisions, CDs and learning via the internet and interactive multi media.

Computer technology is increasingly being used in health education, and as in many other fields, the enhancement of personal computers makes it easier to use them for more than just accessing information. Currently computer and Internet-based health programs are aimed at using multimedia capabilities for various purposes (Mas, Plass, Kane, & Papenfuss, 2003). The health literature has recently included reports on successful programs of treatment. Interactive multimedia-based learning content is also called coursewere. Five aspects of the courseware developed were evaluated based on the following criteria: fulfillment of teaching objectives, user-friendliness of the courseware, student interest, assistance for Physical Education Lecturers and courseware content (Shariffudin, Mislan, Wong, & Julia, 2011). With a planned courseware design, students can easily generate, build new ideas or restructure their existing ideas and apply concepts in different situations effectively (Shariffuddin, 2009). Some of the characteristics of the constructivist class are students learning how to learn and relate their learning to the real world outside the classroom (Brooks, 1999). Constructivism focuses on tools and environments that help students interpret multiple world perspectives with their own experiences (Zaretsky & Evtah, n.d.).

Based on research by (Stacey & Gerbic, 2009), student responses to multimedia systems at least the variables in it consist of assignments (92%), feedback (72%), guidelines for reading (24%), guidelines for field work(12%) , and tutorials (4%). On the other hand, the results show that the use of multimedia graphic organizer softwarecan provide several benefits for writing for elementary

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school children (Lorenz et al., 2009).

(Zhang & Zhang, 2018) research results found that through research and analysis of multimedia physical education teaching in colleges and universities that, compared to traditional physical education teaching and learning systems, multimedia physical education teaching and research methods for colleges and universities are data-oriented assimilation. can greatly increase students' interest in sports learning and thus accelerate their

absorption. Learning with the characteristics of physical / movement practice can also be designed to optimally integrate all physical, motor, cognitive, social and cultural components. One solution is to design interactive multimedia-based learning.

Multimedia elements such as text, graphics, video, audio and animation which are integrated in thedevelopment of badminton courseware will stimulate students to feel as if they are experiencing real situations in practicing certain sports techniques. However, the process of developing multimedia and websites requires lecturers to work together and get help from professionals outside the academic environment. Therefore, it is mandatory for academics to accurately articulate their requests to professionals who assist them and manage learning resource development projects (Stacey & Gerbic, 2009).

Interactive multimedia is an effective and efficient means of science and technology in studying and mastering sports science. Interactive multimedia is one of the learning media that can support students in mastering the material. Through this media students can provide more detailed explanations by providing video shows, narrative in the form of descriptions of implementation, and explanations in writing, so that students can see more clearly, besides that the images and sounds produced will make students more interested in paying attention to the material, indirectly the learning objectives will be achieved.

Mayer defines multimedia learning as learning that occurs from words and images (Richard E. Mayer, 2005). Words usually take the form of some type of explanatory text either narrated or written, and images can be dynamic (eg

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animation and video) or static (eg photos and graphics). Mayer's own research has established a well- known effect called the multimedia principle whereby deeper learning occurs from words and images compared to pictures alone(R. E. Mayer, 2009). According to this definition, multimedia learning includes at least two modalities. Depending on the different modalities used and their form, the cognitive processes that are activated can vary and lead to different learning outcomes.

Integral theoretical considerations in multimedia-based learning are how learners build mental models from words and images. The cognitive theory of multimedia learning according to Mayer is based on three principles (Richard E. Mayer, 2005). First, the information processing system has two channels for processing visual

/ image information individually. Second, each channel has a limited processing capacity, and third, active learning requires coordination of cognitive processes (selecting and arranging relevant words and images into coherent representations and integrating them with prior knowledge). When receiving multimedia material, Mayer argues thatforeign processing should be reduced, essential processing should be managed and generative processing should be facilitated. An example of generative processing is that students create their own images with material from a teacher or lecturer (Höffler & Leutner, 2007).

In practicum learning, especially badminton theory and practice, students are required to not only understand a movement, but also carry it out with various ways of training. To facilitate students' cognitive readiness, stimuli that are strong enough and can be accessed repeatedly anywhere and anytime are needed to support the achievement of the desired basic technique mastery. To enable this to happen is to provide learning resources that contain relevant text and images with explanations that focus on supporting certain technical exercisesin an interesting form, namely multimedia. Having information in the form of tests and pictures that are relevant and focused will make it easier for students to visualize a basic technique and do it well.

The strengths of this research are the context of learning device visuals,

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variations of model items, and the suitability of narrative, multimedia images and videos based on the principles of multimedia integration in learning by Mayer (Mayer, 2014). This research is important to do to support the effectiveness and efficiency of learning under various conditions, both face-to-face and independently. The learning design developed in the form of multimedia allows students to carry out directed learning independently.

METHOD

In this research, the development of an interactive multimedia based badminton basic technique learning model for students is a process that aims to develop a model using research and development methods (R&D).

The research subjects consisted of 300 students who were divided into two classes at three universities in West Java who were randomly selected. Each university has two class groups, one control group class and one experimental group class. The total number of control groups was 3 classes and the total number of experimental classes was 3 classes.

The development of multimedia badminton products is developed with the software "Autoplay Media Studio 8.0". Other supporting software include: Adobe Premier, ispring kinetics, Ms Power point and Flibbook maker. The product development process begins with creating a product design consisting of a content bar chart, content script and a story board. The product design will be made according to the concept that has been determined by the researcher, then after the design is complete, the material is collected in the form of photos, videos, audio and related documents. All materials collected are then combined into a multimedia product, which will then be subject to expert validation and field testing.

The data analysis technique used is the quantitative descriptive analysis technique with a percentage and the T test. The quantitative descriptive technique is used to analyze the quantitative data obtained from the distribution of evaluation questionnaires from badminton experts and learning technology experts regarding the results of the products developed. After going through the expert test / expert test stage, and the first field test, the product is then implemented in the actual class

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at the main trial stage. The implementation was carried out with an experimental model with the pretest and posttest control group method. Two classes at three universities were randomly selected. Each university has two class groups, one control class and one experimental class. The total number of control groups was 3 classes and the total number of experimental classes was 3 classes. Each control class carries out learning as usual with previous learning models equipped with teaching materials previously used by lecturers, including books, powerpoints, and videos on the internet. While the experimental group used multimedia which was developed as a learning resource in learning.

The instruments used to conduct the pretest and posttest are standard instruments and instruments that are developed by themselves. The standard instruments for obtaining basic badminton skill data written by Frank M. Ferducci, are as follows: a) Short serve test, b) Long serve test, c) Lob shot test, d) Smash test, d) Wall volley test (for blow drive). Meanwhile, the instrument developed by himself was used to assess the process of implementing basic badminton game techniques.

Each student who joins the control and experimental classes at each university, has a pre-test and a final test. However, the treatment with the product developed was only given to the experimental class. The number of control classes was three classes, while the experimental class was also three classes, each destination university consisting of one control class and one experimental class. After the preliminary and final test data were collected, the data normality test was carried out as a requirement for the paired and independent T test to determine the effect of the treatment.

RESULTS

The results of the development of the multimedia-based badminton theory and practice learning model are in the form of learning applications and learning manuals for badminton theory and practice subjects. The learning material for badminton theory and practice is packaged in multimedia which can be operated independently by students without the need for an internet network and can be

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opened via a laptop or computer device. In multimedia there are videos, audios, photos, and also captions in the form of text about basic techniques and how to practice.

The learning model developed is the result of the problems found by researchers in the field through observations and interviews with badminton lecturers and the distribution of learning environment analysis questionnaires to students. The results of preliminary research or field findings are then described and analyzed so that these results are descriptive and analytical in nature, with reference to the objectives of the preliminary research.The following will describe the results of the analysis of the learning environment and the development needs obtained by the researcher.

Table 1. Data from Analysis of the Use of Technology in Learning.

Variable	Respons	n	%
Use of Technology in Learning			
Online classes (google classhroom, edmodo, moodle, etc.)	0	300	0
Interactive multimedia	0	300	0
Ebook / electronic book	171	300	57.5
Mobile application / mobile learning	0	300	0
Power point	278	300	92.5
Social media (facebook, twitter, etc.)	60	300	20
Youtube	186	300	62.5

Based on the data above, it can be seen that the most dominant use of technology in learning is power points with a percentage of 92.5%, the lowest is online class (google classroom, edmodo, moodle, etc.), interactive multimedia, mobile / mobile learning applications with a percentage 0%.

Table 2. Data Results of the need for multimedia development

Variable	Respons	n	%
The need for multimedia development			
Interested in using multimedia learning badminton	270	300	90
It is more enthusiastic about learning badminton if it is equipped with multimedia	255	300	85
Agree to develop multimedia badminton which contains videos, pictures, electronic books, music and quizzes	278	300	92.5

Based on the data above, it can be seen that there is a need for the

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development of multimedia containing videos, pictures, electronic books, music and questions with a percentage of 92.5%. Based on the above findings, it can be concluded that the badminton learning model applied in tertiary institutions has been running quite well but still needs to be developed again. By utilizing multimedia, the new badminton learning model created with the aimis expected to be able to facilitate students in learning and practicing better.

After knowing the need and description of the previous learning environment, researchers developed a learning model together with experts. The theoretical feasibility test is carried out by filling out a questionnaire by the experts who have been given the product developed. Experts consist of learning experts, material experts and learning technology experts. Each expert gets a validation product and instrument to provide an assessment andinput on the model being developed.

Based on the assessment of a questionnaire from material experts, technology experts, and learning experts, it was explained that overall the multimedia-based badminton learning model was feasible to be used in initial field trials with improvements. Because it has been declared feasible, the product is implemented in the actual learning conditions. The following are the results of the T test of the pretest and posttest scores with the pretest-posttest control group experimental design in 6 classes in three universities in West Java.

Table 3. Results of the analysis of the T test Paired Sample Test Data on the pretest and posttest basic skills of badminton

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	:d. Error Mean	% Confidence Intervalof the Difference Lower	Upper			
Pair 1	PretestKontrol - PosttestKontrol	-2.638	5.492	1.098	-4.905	-.371	-2.40224		.024
Pair 2	PretestKontrol - PosttestKontrol	.000	13.362	2.672	-5.516	5.516	.00024		1.000

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Pair 3	PretestKontrol - PosttestKontrol	.000	13.619	2.724	-5.622	5.622	.00024	1.000
Pair 4	PretestEksperimen - PosttestEksperimen	-15.893	9.332	1.866	-19.745	-12.041	-8.51524	.000
Pair 5	PretestEksperimen - PosttestEksperimen	-18.531	9.035	1.807	-22.261	-14.802	-10.25524	.000
Pair 6	PretestEksperimen - PosttestEksperimen	-16.834	7.684	1.537	-20.006	-13.663	-10.95424	.000

Explanation :

Pair 1 : Control Group University A

Pair 2 : Control Group University B

Pair 3 : Control Group University C

Pair 4 : Experimental Group University A

Pair 5 : Experimental Group University B

Pair 6 : Experimental Group University C

Based on the Paired Sample Test table above, it can be seen that only Control groups B and C have Sig values. (2-Tailed) is more than 0.05 (2-tailed> 0.05) so that in this result it can be stated that Ho is accepted and Ha is rejected, which means that in control groups B and C there is no difference in the average initial test scores with

the final test. Thus, it can be stated that there is no effect of treatment on improving student badminton learning outcomes. Meanwhile, Pired 1, 4, 5, and 6 have Sig values. (2-Tailed) is less than 0.05 (Sig. (2-Tailed) <0.05) sothat in this result it can be stated that Ho is rejected and Ha is accepted, which means that there is a difference in the results of the initial test and the final test. Thus, it can be stated that there is an effect of treatment on improving student badminton learning outcomes. Meanwhile, to find out whether there is a difference in results between the control group and the experimental group, it is presented in the following table.

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Table 4. Results of the analysis of the T test Independent Sample Test Data on the pretest and posttest basic skills of badminton

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Hasil	Equal variances assumed	.500	.481	-.208	148	.039	-.314	1.512	-3.301	2.673
	Equal variances not assumed			-.208	147.735	.034	-.314	1.512	-3.301	2.673

DISCUSSION

The badminton learning model that has been applied has been running quite well, although not maximally due to problems that arise during field practice, especially model assistance, training variations and also supporting media for independent learning. For this reason, it cannot be denied that there is a need for the latest breakthroughs and innovations in the learning model used, along with current technological advances. By utilizing computer-based multimedia, it is possible to have newness in the badminton learning model that was created with the aim of being able to attract students' interest in learning. The current learning model is not only developed for face-to-face purposes, but must also facilitate students to study independently and in groups outside the face-to-face class. With the development of multimedia-based learning media that can be accessed by students anywhere and anytime, it is hoped that the quality of badminton learning will be of higher quality.

(Cendra et al., 2019) found that audio-visual learning media gave significant effectiveness to the basic technical skills of badminton students of Penjaskesrek, Riau Islamic University, where the results obtained by tcount(10.64) were greater than table (1.734). Previous research results by (Dewi, 2017) showed that the

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validation of multimedia badminton teaching materials in physical education subjects in terms of content was very good with a percentage of 90%. The learning media aspect is good with a percentage of 86%, the learning design aspect is very good with a percentage of 90%. Individual test results are very good with a percentage of 89.3%, small group test results are very good with a percentage of 92.2%, large group test results are very good with a percentage of 91.9%. Based on the results of data analysis and discussion, it is concluded that interactive multimedia badminton basic techniques are suitable for use by students in school. Previous research was also conducted by Pratama by developing learning materials for badminton into interactive multimedia. The results of the badminton expert validation showed a percentage of 91.89%, learning experts showed a percentage of 89.58% and the results of the validation by media experts showed a percentage of 87.80%. With the results of the validation, the product is feasible to be tested. Furthermore, for product trials, the percentage of small group trials was 90.10% and the percentage of large group trials was 91.15% (Mashuri & Pratama, 2019).

In several studies conducted, it has been known that badminton learning also has a lot to do with the development of teaching materials. This shows that badminton learning still requires the support of interesting and quality teaching materials so that the desired basic technique mastery can be maximally achieved. In addition, research conducted previously has not reached the realm of developing tools, the novelty of model items and alsothe implementation of actual learning to determine its effectiveness.

In badminton learning, it is not only developed with multimedia, but with other approaches such as in research that has been conducted to improve learning badminton skills with the portfolio-based WISER model, which combines tablets for instant recording and Facebook for e-portfolios. 97 students in the experimental group were taught with tablets and Facebook, and 102 students in the control group were taught using traditional teaching methods. Paired sample t test and ANCOVA were used for statistical analysis. The posttest smashing and footwork in the experimental group and the control group were both significantly higher than in the

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pretest. The posttest score for smashing was significantly higher in the experimental group than in the control group. For pretest scores higher than 7.66 or lower than 5.09, the posttest footwork scores were significantly higher in EG than in CG. The proposed portfolio-based WISER model can help students strengthen their understanding of badminton skills and improve their skills learning (Lin, Lee, Cheng, Hung, 2020).

Based on the results of existing research which are also supported by the results of the needs analysis andlearning analysis that has been carried out, the researchers have obtained strong information as the basis for developing multimedia-based badminton learning. Some of the items developed by researchers based on otherpreliminary research points are learning designs that are in accordance with higher education curriculum guidelines,items of variations in learning models and multimedia as learning resources that better facilitate badminton learning.

The product planning process is carried out by researchers by discussing with peers, badminton lecturers and also consulting with learning technology experts. So that the draft badminton learning model is compiled. The first design is a learning device that contains course descriptions, learning outcomes, learning material maps, syllabus, and lecture program units. The second design is a draft item model for the basic technique of badminton, which consists of 35 model items that contain basic techniques of service, lob, drive, netting, dropshot and smash. Each model item is equipped with information on tool requirements, exercise objectives, and a description of theimplementation of the model accompanied by illustrated images. The third design is a multimedia storyboard, which is a multimedia layout design that is being developed. multimedia contains text, images and videos.

After the product design is complete, then the researcher collects the required materials, including supporting theory, material item models and video taking per model item that has been designed. Researchers conducted field observations to obtain the right video location with good lighting criteria and a

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conducive field, preparing actors consisting of technical implementers and training assistants. At this stage the researcher collaborates with video shooting and editing experts to get good image results. In addition, the researcher also invited a badminton coach to simultaneously provide direction for the implementation of the existing model items.

After all the texts and videos have been collected, the researchers then combine all the materials in one multimedia container using the autoplay media studio 8.0 application. But problems are encountered when it comes to including video elements in multimedia. The video must first be edited to complement the text in the video, background music as well as a suitable format for the main application. At this stage, the video taken is processed outside the application, so that it becomes a video item model that is ready to be included in the main application. The edited video contains text, musikmlatas, normal shows, slow shows and also some interesting animated scenes.

The product that has been developed is then validated by the experts. Experts who are the subject of this research are learning experts, badminton experts and learning technology experts. Product packages in the form of learning tools, books and multimedia applications are given to all experts. The expert then evaluates while filling out a validation questionnaire. Each expert has provided input and assessment on each item based on the questionnaire developed. All experts have stated that the product being developed is feasible to be tested with several revisions. The revision given by almost all experts is the grouping of video items according to basic techniques determined by book (service, lob, dropshot, netting, smash, and drive), one in three experts suggested additional handgrip techniques and also the addition of several learning items. Thus, initially there were 35 model items, after which revisions were made to become 45 model items. In addition to evaluating model items theoretically, researchers also made improvements on the multimedia side according to expert input, including changes in font type and size, changing video and also changing textbook designs (see the difference between draft 1 and draft 2 in the results of the study).

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Expert validation states the product is worth testing. The trial was conducted at three universities with each university consisting of 12 subjects. This trial aims to determine the feasibility of all model items and at the same time get feedback from students on what they feel when doing each model item. Students do each model item and then fill out the questionnaire provided. Initial trial results show good results and can be implemented. Several notes from the experts who were present and the results of the trial trial were used as the basis for improvement. Among other things, the improvement of the model item description on the basic smash and lob techniques. After the revision was carried out, the researcher conducted a field trial while simultaneously implementing the product in actual learning. At this stage, it was carried out in three universities with one control group and one experimental group for each university. Researchers have coordinated with their respective teaching lecturers about the technical implementation of treatment in the experimental group and implemented it according to the lecture schedule at each university.

CONCLUSIONS

The results of the model implementation were carried out using the experimental pretest and posttest control group designs. Based on the results of the T-Test Paired Sample Test, it can be seen that only Control groups B and C have Sig values. (2-Tailed) is more than 0.05 (2-tailed> 0.05) so that in this result it can be stated that Ho is accepted and Ha is rejected, which means that in control groups B and C there is no difference in the average initial test scores with the final test. Thus, it can be stated that there is no effect of treatment on improving student badminton learningoutcomes. Meanwhile, Paired 1, 4, 5, and 6 have Sig values. (2-Tailed) is less than 0.05 (Sig. (2-Tailed) <0.05) so that in this result it can be stated that Ho is rejected and Ha is accepted, which means that there is a difference in the results of the initial test and the final test. Thus, it can be stated that there is an effect of treatment on improving student badminton learning outcomes.

Based on the results of the T Test statistics in the Equal variances assumed section known as Sig. (2-tailed) is 0.039 <0.05, thus Ho is rejected and Ha is

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accepted, which means that there is a difference in the average test results of the control group and the experimental group. Based on the statistical results of the T test, it can be seen that between the control group and the experimental group there is a significant difference in the results of the final test. This shows that the developed model which was implemented as a treatment for the experimental group, has a better effect than the control group. However, in the control group, of the three groups, there was one group whose paired t test results showed a significant difference between the initial test and the final test. This is something that isbeyond the prediction of the researcher, because there are other factors that may influence this achievement outside the variables studied.

REFERENCES

Brooks, J. G., & Brooks, M. G. (1999). *In search of understanding: The case for constructivist classrooms*. AscD.

Cendra, R., Gazali, N., & Dermawan, M. R. (2019). *Efektivitas media pembelajaran audio visual terhadap keterampilan teknik dasar bulu tangkis The effectiveness of audio visual learning media towards badminton basic technical skills PENDAHULUAN Keberhasilan dalam proses pembelajaran merupakan hal yang san*. *5*.

Dewi, N. L. A. M. (2017). *Pengembangan Multimedia Interaktif Teknik Dasar Bulutangkis Pada Mata Pelajaran Pendidikan Jasmani Olahraga Dan Kesehatan*. *8*(2).

Höffler, T. N., & Leutner, D. (2007). Instructional animation versus static pictures: A meta-analysis. *Learning and Instruction*, *17*(6), 722–738. https://doi.org/10.1016/j.learninstruc.2007.09.013

Lin, K. C., Lee, I. C., Cheng, C. F., & Hung, H. C. (2020). The Effects of Adopting Tablets and Facebook for Learning Badminton Skills: A Portfolio-Based WISER Model in Physical Education. *Journal of Educational Technology & Society*, *23*(4)

Lorenz, B., Green, T., & Brown, A. (2009). Using multimedia graphic organizer software in the prewriting activitiesof primary school students: What are the benefits? *Computers in the Schools*, *26*(2), 115–129. https://doi.org/10.1080/07380560902906054

Mas, F. G. S., Plass, J., Kane, W. M., & Papenfuss, R. L. (2003). Health education and multimedia learning:educational psychology and health behavior theory (Part 1). *Health promotion practice*, *4*(3), 288-292.

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Mashuri, H., & Pratama, B. A. (2019). Peran Permainan Tradisional dalam Pendidikan Jasmani untuk Penguatan Karakter Peserta Didik. *Proceedings of the National Seminar on Women's Gait in Sports Towards a Healthy Lifestyle*, *April*. http://ejournal.utp.ac.id/index.php/PROPKO/article/view/865

Mayer, R. E. (2009). Multimedia Learning. *Multi-Media Learning*, *2*, 318. https://doi.org/10.1016/S0079-7421(02)80005-6

Mayer, Richard E. (2005). Multimedia Learning. In *Multimedia Learning* (Vol. 1). https://doi.org/10.1017/CBO9781107415324.004

Pratama, F. A., Dwiyogo, W. D., & Supriyadi, S. (2019). Media Pembelajaran Bulutangkis dalam Bentuk Multimedia Interaktif pada Mahasiswa. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, *4*(3), 382-386.

Sadiman, A. S., Rahardjo, R., & Haryono, A. (2003). Media pendidikan: pengertian, pengembangan danpemanfaatannya.

Samarawickrema, G. (2009). Blended learning and the new pressures on the academy: Individual, political, and policy driven motivators for adoption. In *Effective blended learning practices: Evidence-based perspectives in ICT-facilitated education* (pp. 222-238). IGI Global.

Shariffuddin, R. (2009). Instructional design and innovations using technology: Theories into practice. *Malaysia:Atan, NA (Ed.)*

Shariffudin, R. S., Mislan, N., Wong, C. K., & Julia, G. C. H. (2011). Teaching Psychomotor Skills with E-SportsCourseware. International Journal of E-Education, E-Business, E-Management and E-Learning, 1(4), 291–298.

Stacey, E., & Gerbic, P. (2009). Effective Blended Learning Practices: Evidence-Based Perspectives. In *ICT- Facilitated Education, Information science reference* (Issue November). Information Science Reference (animprint of IGI Global).

Zaretsky, E., & Evtah, D. N. (n.d.). *Developing Digital Simulations and its Impact on Physical Education of Pre- Service Teachers Givat Washington Academic College of Education*. *4*(4), 23–29.

Zhang, L., & Zhang, Y. (2018). Evaluation of multimedia physical education quality in colleges and universities oriented to data assimilation. *Proceedings - 2018 International Conference on Robots and Intelligent System,ICRIS 2018*, 421–424. https://doi.org/10.1109/ICRIS.2018.00111

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