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Development of application-based badminton material teaching media for middle school level PJOK teachers

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Abstract: This development research has the goal of developing application-based badminton game learning using the Java programming language which is used as a supporting tool for learning badminton game material for Middle School PJOK Teachers in Kediri Regency as well as being a reference and development for further research. This research method refers to the development research method of Sugiono, which. The test subjects in this study involved 40 SMP PJOK teachers in Kediri Regency, consisting of 10 teachers involved in the small group trial and 30 teachers involved in the large group trial. The results of the analysis carried out by experts who have carried out the validity of this application product, the percentage of learning expert evaluations is obtained, which means it is very valid, the results of the evaluation of badminton playing experts mean it is very valid, the results of the evaluation of media experts mean it is very valid. So based on these results, the research product of this badminton material learning application application was declared "fit for use" for learning badminton game material for junior high school PJOK teachers in Kediri Regency.

Keywords: learning; application media; badminton.

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INTRODUCTION

According to Dasupang & Pane (2017) learning is a process to regulate the environment of students or students so that they can encourage and create a learning atmosphere for students. Learning is an attempt to transfer knowledge or information using certain methods in order to achieve the desired goals (Don, et al. 2018). Of course, a systematic learning process must originate from KI-KD in the curriculum. This expression is in line with Kristin (2016) in his journal which reveals that the process of learning activities will run and get maximum results if there is a good relationship between students, teachers and the existing curriculum. Whatever the level of education, of course the learning material delivered must be in accordance with the KI-KD in the curriculum.

There are many levels of education from elementary to university. At the junior high school education level, for example, there are many subjects including PJOK or physical education which contain a lot of material, one of which is badminton. According to Yuliansyah, et al (2021) physical education is a learning activity that focuses on the emotions and movements of students. Badminton is a sport that is very popular and popular in Indonesia and the lessons taught in physical education subjects in Indonesia (Lismadiana, et al, 2020). According to Arwih, Fitria & Saifu (2020) badminton is a game that is stiffened by hitting the ball

or *shuttlecock* using a racket to be able to cross the net with the aim of attacking and positioning the ball so that it cannot be reached by opposing players. According to Cendra & Gazali (2017) in their research journal said that the game of badminton is very familiar among students because it has been included in the O2SN competition. In Permendikbud Number 37 (2018) specifically on badminton material students are required to master basic competencies and core competencies gradually, starting from class VII given basic badminton technique material, class VIII material variations on basic badminton techniques, until class IX enters variations and combinations of badminton games. However, PJOK learning activities, especially badminton material in Kediri Regency, are still not going well and still do not refer to the curriculum because PJOK teachers still often generalize the provision of badminton material and do not focus on the existing curriculum so that the learning objectives are not optimally achieved.

According to Asro & Muna (2019) the achievement of learning objectives is largely determined by how the learning process is carried out. In addition to selecting material, the use of media elements in delivering will also greatly affect the quality of learning (Yanto, 2019). Learning media is anything that is used by students in providing subject matter to students (Dewi, 2017). According to Kurniawan, et al (2021) the use of attractive and efficient media will foster students' interest and enthusiasm for learning. This statement is in line with Maimunah (2016) which states that the use of interesting and not monotonous media will increase motivation and new stimulation to students. According to Lestari (2018) teachers must innovate themselves more in honing themselves to utilize technology in order to create a fun and not boring learning atmosphere. The increasingly rapid development of the times in terms of technology followed by the development of the characteristics of students or students where the need for teaching requires new innovations to improve innovative ways of learning to adapt technological developments in learning activities according to the curriculum including physical education lessons (Belmonte, et al. 2019). In this era of globalization, many new learning media have grown which are more interesting and can be used to facilitate learning activities.

Among them is learning media based on *Android* technology *smartphone* among students, application development as teaching media will be very useful and effective (Arista & Kuswanto, 2018). Application *Android* is *software* that can be accessed using *smartphone*-based *Linux* that is widely used by people in all walks of life (Kuswanto & Radiansah, 2018). The more students who have *Android smartphones* there will be many opportunities to develop an effective and efficient application-based learning to support learning activities (Astuti. et al., 2017). According to Herlina & Suherman (2020) innovative learning development innovations are needed during the *Covid-19* to overcome boredom and increase interest in learning and to achieve learning objectives in PJOK subjects.

In previous research conducted by Firlando. et al (2020) by creating soccer learning media using a *java* at SMPN SMP Ar Risalah Lubuklinggau, the result is an increase in student learning motivation because it uses learning media that is efficient and can be carried out anywhere and anytime. In previous research, according to Artanayasa, Dewi & Suwiwa (2018), interactive multimedia applications used in learning basic

badminton techniques at Singaraja State Middle School received good marks after being tested on experts and students so that they can be used as an effective and efficient learning resource. Based on the data from the needs analysis, learning activities for badminton material in Kediri Regency still use print learning media and *YouTube*, and there is no development of effective and efficient application-based interactive learning developed by teachers in badminton material.

Based on the results of initial observations from the collection of needs analysis data for SMP-level PJOK TEACHER in Kediri Regency conducted by researchers on April 10, 2021 through a direct questionnaire filled out by 40 PJOK MGMP teachers, the result was that 100% of the teachers had given badminton material, there was 100% of teachers have provided badminton material using print media such as books, lesson plans or worksheets, 90% of teachers have provided badminton material using learning media based on video and *powerpoint*, 100% of teachers have cellphones or *smartphones*, 100% of teachers have never developed teaching media for badminton material based on *android* application-based learning development is held *android* an effective and efficient with a load of badminton game material. And based on the interviews that the researchers conducted with the Head of the Kediri Regency MGMP, the results were obtained, namely that there were only 1-2 meetings of badminton material learning in the learning process which was carried out with field practice but there was a lack of emphasis on basic competencies and core competencies and there was no development of teaching media applications-based badminton material *android* in Kediri Regency.

With this problem, the researchers tried to solve the problem by developing learning applications using *Java* which contained badminton game material for Middle School PJOK Teachers in Kediri Regency. According to Ali (2019) *Java* is a type of programming language with very rapid development and can be run in many applications or web-shaped application devices *and* can be run on many *platforms* including using *the Android*, *Windows*, and *Linux platforms.* By using the *Android*, there are several aspects why this research is important to do, namely, to make it easier for teachers to convey subject matter and make it easier for students to understand the material presented both with *online* and *offline*. The application also displays material material for badminton games which are supported by clear images, video and audio and there are evaluation questions that can be accessed easily. This research has the goal of developing badminton material learning products containing pictures, material, video (audio-visual) with animations that are made as attractive as possible so that the objectives of learning badminton material for PJOK Teachers at the Middle School Level in Kediri Regency can be achieved.

METHOD

This study refers to the development research steps of Borg & Gall (1983) in Sugiyono (2016) using a modified procedure as follows (1) Potential & problems, namely analyzing problems by conducting interviews with the Head of MGMP SMP Kediri Regency, (2) Data collection, namely collecting data called needs analysis and conducting interviews with PJOK Teachers in Kediri Regency, (3) Product Design is the

stage of developing an application product that contains badminton material for junior high school students by taking videos, recording audio, entering material, editing applications and so on, (4) Design validation, namely the stage of testing the feasibility of the product before testing. In this stage there are 3 experts, namely Learning Experts, Badminton Game Experts and Media Experts. (5) Design revision, namely the stage of evaluating and revising the product based on expert input at the validation stage. (6) Product Trial, namely the product testing stage involving 40 PJOK Teachers of Kediri Regency, divided into 2 groups, namely 10 teachers in small groups and 30 teachers in large groups. (7) Product revision, namely the final revision stage from the previous trial stage input. (8) Final Product at this stage the product is ready to be used by PJOK Teachers in Kediri Regency to provide badminton game material to students.

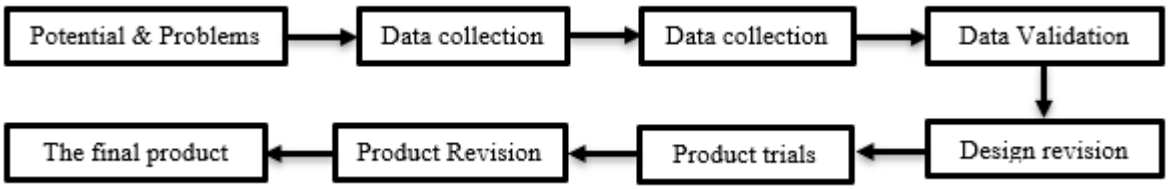

Figure 1. Procedure for Developing Application-Based Badminton Game Learning Media for PJOK Teachers in Kediri Regency

This research obtained qualitative and quantitative data. Qualitative data were obtained through evaluations of learning experts, badminton game experts, media experts and the results of interviews with the Head of the MGMP PJOK SMP Kediri Regency and the results of a questionnaire distributed to PJOK teachers in Kediri Regency. Meanwhile, quantitative data is the result of numerical analysis from product tests by PJOK teachers in Kediri Regency. The variable used is in the form of learning media for badminton material in the form of applications with the *Java*.

This Development Research has several data collection instruments including initial observation for needs analysis in the form of a questionnaire filled out by PJOK Teachers of SMP Kediri Regency, expert validation questionnaires namely learning experts, media experts, badminton game experts and product testing. The technical stages of analyzing the research data are in the form of descriptive statistics technique for measuring in the process of collecting data uses a *Likert*, with the aim of measuring the attitudes or views of individuals or groups towards the phenomena that occur (Sugiyono, 2016). The results of data analysis are used to improve the product being developed scale instrument *Likert* has category aspects ranging from very positive to negative.

Table 1. Rating Scale for Positive Statements

No.	Explanation	Answers	Positive Score
1.	Strongly Agree	A	4
2.	Agree	B	3
3.	Undecided	C	2
4.	Disagree	D	1

Source: Sugiyono (2016)

The formula for data processing is in the form of descriptive quantitative percentage analysis from Akbar & Sriwiyana (2011), as follows:

$$V = \frac{TSEV}{S - max} \times 100\%$$

Description:

V : Validity.

TSEV : Total empirical score of the validator.

S-max : Maximum expected score.

100% : Constant number.

Next according to Akbar & Sriwiyana (2011) to process and conclude the results of the analysis in the form of percentages so that they are categorized as below:

Table 2. Product Quality Criteria

Criteria	Description	Meaning
75.01%-100.00%	Very Valid	Used without revision
50.01%-75.00%	Valid Enough	Used with minor revisions
25.01%-50.00%	Invalid	Cannot be used
00.00% -25.00%	Very Invalid	Forbidden to use

Source: Akbar & Sriwiyana (2011)

RESULTS AND DISCUSSION

There are seven main contents in this badminton learning application, namely KI-KD, Learning Materials, Learning Videos, Facilities and Infrastructure, Evaluation Questions, References and Developer Profile. The entire material and use of the application program have been prepared so that it can be used effectively and efficiently and is displayed in an attractive design so that learning objectives can be more easily achieved.

Figure 2. Main Display of Application Products

The following is a discussion of product development, presentation of data consisting of needs analysis instruments, expert validation, product trials and product revisions.

Table 3. Results of Data Analysis of Learning Experts

No.	Aspect	%	Category
1.	Attractiveness	91%	Very Valid
2.	Ease	82%	Very Valid
3.	Conformity	100%	Very Valid
4.	Accuracy	82%	Very Valid
	Validity	87%	Very Valid

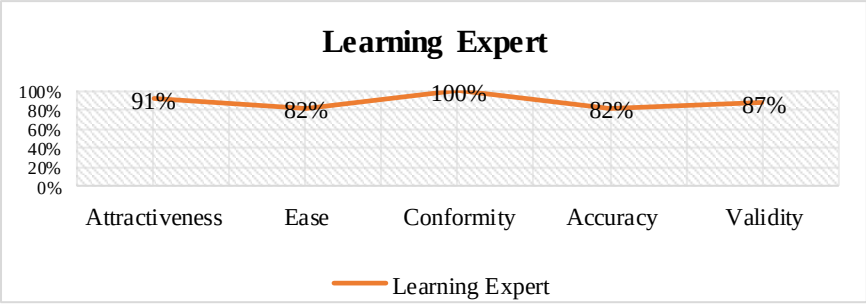

Figure 3. Learning Expert Research Diagram

Table 4. Revision from Learning Experts

No.	Before Revision	After Revision
1.	Learning videos have not been grouped and made according to KI-KD as a whole.	Learning videos are made according to KI-KD and are presented in more detail.
2.	There are no supporting images on the learning material menu.	Learning materials have been added pictures to facilitate student understanding.
3.	There are no examples of motion sequence material on the class IX learning material menu.	Added material for a series of motion variations on the basic techniques of badminton on the class IX learning material menu.
4.	There are several writing errors on the evaluation question menu.	All text on the evaluation question menu is neat and written correctly.

The first data is a presentation of quantitative data obtained from the evaluation of learning experts regarding application products for learning badminton material using the *Java* for Middle School PJOK Teachers in Kediri Regency with a level on the attractiveness aspect of 91% which is classified as very valid, the convenience aspect is 82% classified as very valid, the aspect 100% suitability, which is classified as very valid and the accuracy aspect of 82%, which is classified as very valid. Based on the results of the data on all aspects, it can be concluded that the results of the analysis of this product development obtain a validity of 87% so that it can be interpreted as very valid.

Table 5. Results of Badminton Game Expert Data Analysis

No.	Aspect	%	Category
1.	Clarity	83%	Very Valid
2.	Attractiveness	83%	Very Valid
3.	Accuracy	92%	Very Valid
	Validity	84%	very valid

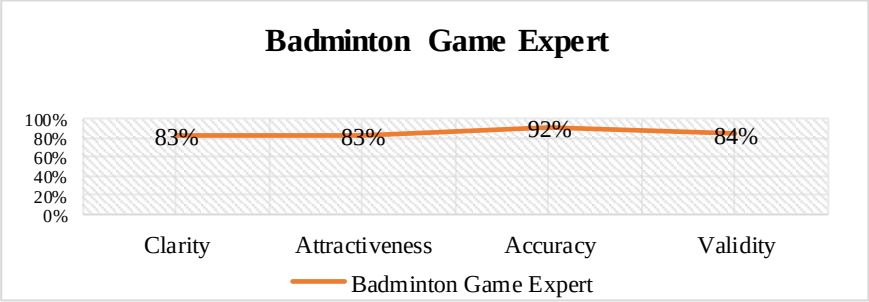

Figure 4. Badminton game expert assessment diagram

Table 6. Revision of Badminton Experts

No.	Before Revision	After Revision
1.	The learning video for holding a racket that is presented is still lacking in detail in its implementation.	The learning video for holding a racket has been presented correctly and clearly.
2.	The learning video for variations of footwork or *footwork* has not been presented in detail from the side of singles and doubles games.	The learning video for variations of footsteps or *footwork* has been presented correctly and clearly.
3.	The backhand learning video is still not quite right in its implementation.	The backhand learning video has been presented correctly and clearly.
4.	The variety of smash strokes is still incomplete.	The smash punch video has been presented completely and clearly.

The second data is the presentation of quantitative data obtained from the evaluation of badminton game experts regarding product application learning material for badminton using the *Java* for Middle School PJOK Teachers in Kediri Regency with an aspect level of clarity of 83% classified as very valid, an aspect of attractiveness 83% classified as very valid, an aspect of accuracy 92% classified as very valid. Based on the results of the data on all aspects, it can be concluded that this development product obtains a validity of 84% so that it can be interpreted as very valid.

Table 7. Results of Media Expert Data Analysis

No.	Aspect	%	Category
1.	Clarity	96%	Very Valid
2.	Attractiveness	84%	Very Valid
3.	Ease	100%	Very Valid
4.	Accuracy	100%	Very Valid
	Validity	93%	Very Valid

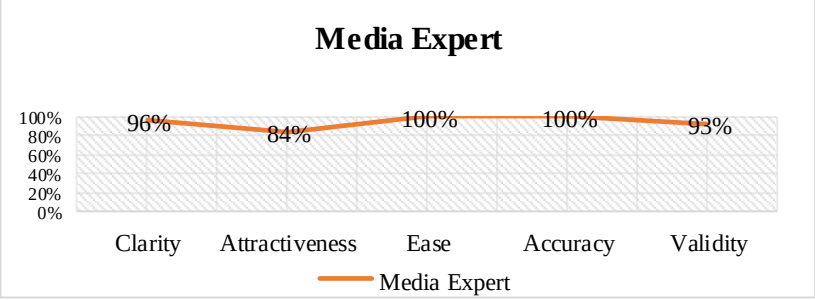

Figure 5. Media Expert Assessment Diagram

Table 8. Revision from Media Experts

No.	Before Revision	After Revision
1.	There are no supporting images on the learning material menu.	All infrastructure materials have been added with pictures to make it easier for students to understand.

The third data is the presentation of quantitative data obtained from the evaluation of media experts regarding application products for learning badminton material using the *Java* for Middle School PJOK Teachers in Kediri Regency with an aspect level of clarity of 96% classified as very valid, the attractiveness aspect of 84% is classified as very valid, the aspect of convenience is 100 % is classified as very valid and the accuracy aspect is 100% which is classified as very valid. Based on the results of the data on all aspects, it can be concluded that this development product obtains a validity of 93% so that it can be interpreted as very valid.

Table 9. Small Group Trial Analysis Results

No.	Aspect	%	Category
1.	Clarity	79%	Very Valid
2.	Attractiveness	79%	Very Valid
3.	Ease	79%	Very Valid
4.	Accuracy	78%	Very Valid
	Validity	79%	Very Valid

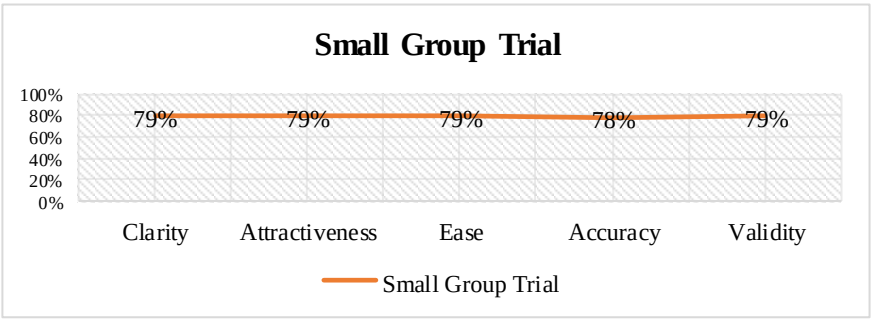

Figure 6. Small Group Trial Assessment Diagram

Fourth data is the presentation of quantitative data through 10 SMP PJOK teachers regarding badminton material learning application products using the *Java* for SMP PJOK Teachers in Kediri Regency with a level of clarity of 79% classified as very valid, 79% for attractiveness aspects classified as very valid, 79% for convenience aspects. classified as very valid and the accuracy aspect of 78% is classified as very valid.

Based on the results of the data on all aspects, it can be concluded that this development product obtains a validity of 79% so that it can be interpreted as very valid.

Table 10. Results of Analysis of Large Group Trials

No.	Aspect	%	Category
1.	Clarity	83%	Very Valid
2.	Attractiveness	84%	Very Valid
3.	Ease	83%	Very Valid
4.	Accuracy	83%	Very Valid
	Validity	83%	Very Valid

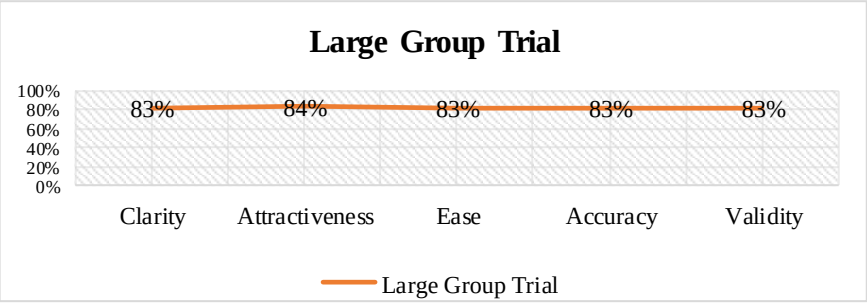

Figure 7. Large Group Trial Assessment Diagram

The fifth data is the presentation of quantitative data through 40 Middle School PJOK Teachers regarding product application learning material for badminton using the *Java* for Middle School PJOK Teachers in Kediri Regency with an aspect level of clarity 83% classified as very valid, 84% for attractiveness aspects classified as very valid, 83% for convenience aspects classified as very valid and the accuracy aspect of 83% was classified as very valid. Based on the results of the data on all aspects, it can be concluded that this development product obtains a validity of 83% so that it can be interpreted as very valid. The overall suggestions from each expert on application products have been improved to make the product even more perfect.

The final product of this research is learning media in the form of an application using *Java* which contains badminton game material for PJOK Teachers at SMP Kediri Regency. According to Arliando, Sallaby & Utami (2015) in his journal said that *Java* is a programming language commonly used in making applications that can be accessed using *smartphones android* with functions including so that the display is more attractive. According to Irsan (2015) *library* in *Java* is very diverse and complete, which has been provided and contains a collection of programs to facilitate the process of making the product the programmer wants. Java is a basic level coding language but can produce attractive and attractive application results according to the programmer's wishes (Nugroho & Rusli, 2017). According to Chotimah (2018) in his journal states that a media or learning device that is packaged in an interesting and varied way really helps students understand the material. Based on the data from the needs analysis, among others, it was stated that 100% of teachers agreed that if effective and efficient badminton learning media were developed, of course

this would be in line with the existence of *Java* which were arranged with effective material coverage and an attractive appearance to achieve learning objectives.

Applications *android* as learning support has the potential to succeed in seeing the increasingly widespread use *of android smartphones* in junior high school students. The use of interesting learning media will certainly provide a positive stimulus to students in participating in learning activities (Karo & Rohani, 2018). Sourced from expert validation data and trials that the badminton material learning application products that have been developed by researchers have very valid results in product attractiveness.

The game of badminton is very popular with the community and can be played by anyone (Majid, et al. 2021) The game of badminton is a game that requires a very complex combination of movements, starting from holding a racket, hitting the ball, moving your feet, to producing a punch that can kill the opponent's defense (Mauludy & Sartono, 2017). According to Sholeh (2017) badminton is a game played by hitting the *shuttlecock* to the opponent's area. Badminton is one of the many PJOK materials contained in the curriculum from elementary to high school with certain learning stages (Sukarini, 2020). In Permendikbud Number 37 (2018) specifically on badminton material students are required to master basic competencies and core competencies gradually, starting from class VII who is given basic badminton technique material, class VIII material variations on basic badminton techniques, until class IX enters variations and combinations of badminton games. Based on expert validation data, product testing and revision, it is obtained from research data that the scope of material in learning applications has very valid accuracy results.

There are several menus and material content displayed in the form of images, text to learning videos that are presented as attractively as possible in this application. According to Yudianto (2017) videos can help direct students' concentration and attention. According to Kamlin & Keong (2020) video media really helps students understand learning material because the understanding process becomes easier with the right display and interesting material. Based on research data from experts and trials, the results show that the presentation of video material has a very valid level of accuracy and attractiveness. The results of developing application-based badminton teaching media products using the Java programming language for SMP PJOK TEACHER, Kediri Regency have gone through several revision stages to obtain product results that are very valid and feasible to use.

CONCLUSION

The results of research on the development of teaching media for application-based badminton materials with Java programming can be stated to have clarity, convenience, attractiveness, suitability and accuracy which are very valid according to the results of validation by several experts and product testing by PJOK teachers at SMP Kediri Regency. Thus this application product is suitable for use in badminton learning activities.

REFERENCES

Akbar, S. & Sriwiyana, H. (2011). *Pengembangan Kurikulum dan PembelajaranIlmu Pengetahuan (IPS)*. Yogyakarta: Cipta Media.

Ali, A. F . (2019). Rancang Bangun Aplikasi Penjualan Barang Berbasis Java Programimming. *Jurnal SIMTIKA,* 2(1), 8–17.

Arista, F. S & Kuswanto, H. (2018). Virtual Physics Laboratory Aplication Based On The Android Smartphone To Improve Learning Independence And ConceptualsUnderstanding. *International Journal Of Instruction,* 11(1), 1-16.

Arliando, Y., Sallaby, A. F., & Utami, F. H. (2015). Aplikasi Widget Berbasis Java. *Jurnal Media Infotama*, *11*(2), 171–180.

Artanayasa, I. W., Dewi, N. L. A. M., & Suwiwa, I. G. 2018. Pengembangan Multimedia Interaktif Teknik Dasar Bulutangkis pada Mata Pelajaran Pendidikan Jasmani Olahraga Dan Kesehatan. *Jurnal Pendidikan Jasmani, Kesehatan dan Rekreasi Pendidikan Jasmani,* 8(2), 37-44.

Arwih, M. Z., Fitria, N,. & Saifu. (2020). Studi Analisis Keterampilan Teknik Dasar Permainan Bulutangkis pada Siswa Putra Peserta Ekstrakulikuler SMPN 3 Kapontri. *Jurnal Penelitian Ilmu Keolahragaan*, 1(1), 35–47.

Asro, M. K & Muna, N. (2019). Pengaruh Kompetensi Pedagogik Guru Dan Pemanfaatan Media Pembelajaran Terhadap Hasil Belajar Fiqih Di MA Darussalam Krempyang Nganjuk. *Jurnal Intelektual: Jurnal Pendidikan dan Studi Keislaman*, 9(2), 217–228.

Astuti, I. A. D., Sumarni, A. R & Saraswati, L. D. (2017). Pengembangan Media Pembelajaran Mobile Learning Berbasis Android Pada Materi Sifat Koligatif Larutan. *JRPK: Jurnal Riset Pendidikan Kimia* 7(2):160–67.

Belmonte, J. L. (2019). Academic Effects Of The Use Of Flipped Learning In Physical Education. *International Journal Of Evironmental Research an Public Health,* 17(2), 2-14.

Borg, W. R & Gall, J. P. (1983). *Educational Research*. An Introduction: New York and London. Longman Inc.

Cendra, R. & Gazali, N. (2017). Pelatihan Shuttle Time Bulutangkis Di Sd Negeri 91 Pekanbaru. *Jurnal Pengabdian Kepada Masyarakat* 23(2):305.

Chotimah, I., Oktaviani, S., & Madjid, A. (2018). Evaluasi Program Tb Paru Di Puskesmas Belong Kota Bogor Tahun 2018. *Jurnal Kesehatan Masyarakat*, *1*(2), 87–95.

Dasupang, M. D. & Pane, A. (2017). Belajar dan Pembelajaran. *Jurnal Kajian Ilu Keislaman*, 3(2):33–52.

Dewi, K. (2017). Pentingnya Media Pembelajaran Untuk Anak Usia Dini." *Raudhatul Athfal: Jurnal Pendidikan Islam Anak Usia Dini* 1(1):81–96.

Don, A. D. (2018). Learning Aplication Of Lampung Language Based On Multimedia Software. *International Journal of Engineering & Technology*, 7(2), 175-181.

Firlando, R., Frima, R & Sunardi, L. (2020). Aplikasi Pembelajaran Teknik Dasar Sepak Bola Berbasis Android. *Jurnal Teknologi Informasi Mura.* 12(02), 166-172.

Herlina & Suherman M. (2020). Potensi Pembelajaran PJOK Ditengah Pandemi Corona Di Sekolah Dasar. *Journal Sport Sciense And Physycal Education*, 8(1) 1-7.

Irsan, M. (2015). Rancang bangun aplikasi mobile notifikasi berbasis android untuk mendukung kinerja di instansi pemerintahan. *JustIN (Jurnal Sistem dan Teknologi Informasi)*, *3*(1), 115-120.

Kamlin, M. B., & Keong, T. C. (2020). Adaptasi Video dalam Pengajaran dan Pembelajaran Abstrak Adopting Video in Teaching and Learning Abstract Pengenalan Tinjauan Literatur Teori Kognitif Pembelajaran Multimedia Mayer. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*,

5(10), 105–112.

Karo, I. R. K. & Rohani . (2018). Manfaat Media dalam Pembelajaran. *Axiom*, 91–96.

Kristin, F. (2016). Analisis Model Pembelajaran Discovery Learning Dalam Meningkatkan Hasil Belajar Ipa-Biologi. *Jurnal Pendidikan Dasar Perkhasa*, 2(2).

Kurniawan, A, W. (2021). Pengembangan Perangkat Pembelajaran Gerak Dasar Lari Berbasis Articulate Storyline. *Journal Sport Science and Health*, 3(4), 108-191.

Kurniawan, R., Kurniawan, A. W., & Wijaya, D. (2021). Students' interest in physical education learning: Analysis of internal and external factors. *Journal Sport Area*, *6*(3), 385-393.

Kuswanto, J. & Radiansah F. (2018). Media Pembelajaran Berbasis Android Pada Mata Pelajaran Sistem Operasi Jaringan Kelas XI. *Jurnal Media Infotama*, 14(1).

Lestari, I. D. (2018). Peranan Guru Dalam Penggunaan Media Pembelajaran Berbasis Information And Communication Technology (ICT) Di SDN RRI Cisalak.*Jurnal SAP*, 3(2):137–42.

Lismadiana, L., Nanda, F. A & Prabandaru, R. D. (2020). Problem-Based Learning Approach To Improve Service Skills Of Badminton In Physical Education Learning. *International Journal Of Education and Learning, 2(1),* 14-24.

Maimunah. (2016). Metode Penggunaan Media Pembelajaran. *Al-Afkar : Jurnal Keislaman & Peradaban* 5(1).

Majid, R. F., Julianti, R. R., & Iqbal, R. (2021). Tingkat Pengetahuan Siswa Tentang Permainan Bulutangkis Kelas VIII di SMP Negeri 1 Telukjambe Barat Kabupaten Karawang. *Jurnal Ilmiah Wahana Pendidikan*, *7*(6), 217-225.

Mauludy, N. G., & Sartono, H. (2017). Hubungan Koordinasi Mata Dan Tangan Dengan Hasil Pukulan Drive Dalam Permainan Bulutangkis. *Jurnal Kepelatihan Olahraga*, *9*(1), 64–71.

Nugroho, A & Rusli, M. (2017). Development Of Multimedia Interactive Computer-Based Learning: Case Studies In The Learning Of Logic. *International Journal Of Computer Aplication*, 176(8), 8-14.

Permendikbud RI Nomor 37 Tahun 2018 Tentang Perubahan Atas Peraturan Menteri Pendidikan Dan Kebudayaan Nomor 24 Tahun 2016 Tentang Kompetensi Inti Dan Kompetensi Dasar Pelajaran Pada Kurikulum 2013 Pada Pendidikan Dasar Dan Pendidikan Menengah. *JDIH Kemendikbud* , 1–527.

Sholeh, M. (2018). Hubungan Antara Kekuatan Otot Lengan, Dengan Kemampuan Long Service Dalam Permainan Bulutangkis Pada Pemain Pembinaan Prestasi Bulutangkis Utp Surakarta Tahun 2017. *Jurnal Ilmiah PENJAS*, *4*(1), 68–78.

Sugiyono. (2016). *Metode Penelitian Manajemen*. Alfabeta.

Sukarini, N. N. (2020). Meningkatkan Hasil Belajar Pendidikan Jasmani Olahraga dan Kesehatan (PJOK) Materi Permainan Bola Basket melalui Penerapan Model Pembelajaran Problem Based Learning. *Journal of Education Action Research*, *4*(3), 371–377.

Syamsudin, A. (2020). Analisis Kesalahan Coding Pemrograman Java Pada Matakuliah Algoritma Pemrograman Mahasiswa Tadris Matematika Iain Kediri. *Factor M*, *2*(2), 102–114. https://doi.org/10.30762/f_m.v2i2.1711

Yanto, D. T. P. (2019). Praktikalitas Media Pembelajaran Interaktif Pada Proses Pembelajaran Rangkaian Listrik. *INVOTEK: Jurnal Inovasi Vokasional Dan Teknologi* 19(1):75–82.

Yudianto, A. (2017). Penerapan Video Sebagai Media Pembelajaran. *Seminar Nasional Pendidikan 2017*, 234–237.

Yuliansyah, A., & Ayu, M. (2021). The implementation of project-based assignment in online learning during covid-19. *Journal of English Language Teaching and Learning*, *2*(1), 32-38.