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The effectiveness of using mobile learning applications badminton game

Suryo Idaman[1], Silvi Aryanti[1*], Destriani[1], Samsul Azhar[1]

[1]Physical Education and Health, , Universitas Sriwijaya, Road Palembang Prabumulih- Palembang 32 Km Palembang, 30671 Indonesia.

[1]suryoidaman2@gmail.com; [1*]silviaryanti@fkip.unsri.ac.id; [1] destriani@fkip.unsri.ac.id; [1]Samsul@fkip.unsri.ac.id
*Correspondence Author

ABSTRACT

The subject of physical education sports health has an important meaning in the process of growing students in a healthy and active life, because physical education sports health is part of the education system as a whole. The period of online to offline transmission causes a lack of effectiveness in using smartphones, so students do not understand the material on badminton material. The purpose of this study was to determine the effectiveness of the implementation of mobile learning applications on badminton game material at State Islamic High School Number 1 Ogan Ilir. This research has both theoretical and paractic benefits for researchers, teachers, schools and students. The method used in the research is the Classroom Action Research method. The research subjects were 26 people consisting of 15 male students and 11 female students in class X. The stages of this classroom action research adopt the Hopkins model, namely the planning stage, action implementation stage, observation stage, and reflection stage. test data analysis using student test learning outcomes. The results of this study are students in class X at State Islamic High School Number 1 Ogan Ilir using video-based mobile learning on technical material can be said to be effective, with a contextual value at pre-skilus resistance 61.9%, cycle I 67.7%, cycle II 80%. This study concludes that the use of mobile learning is effective for badminton learning.
Keywords:*phyiscal education, mobile learning, badminton*

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Correspondence Address:
Silvi Aryanti
Faculty of Teacher Training and Education, Physical Education, Health and Recreation, Universitas Sriwijaya
Road Raya Palembang - Prabumulih No.KM. 32, Indralaya
E-mail: silviaryanti@fkip.unsri.ac.id

INTRODUCTION

Education is a conscious and planned effort to create a learning atmosphere and learning process and learning so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and State (Victorian et al., 2020). The function of education is to develop abilities and shape the character and civilization of a dignified nation (Ridlo, Azi Faiz & Saifulloh, 2018). Physical education sports health has an important meaning in growing students in a healthy and active life, because part of the education system as a whole (Destriana et al., 2022).

Physical education has an important meaning in growing students in a healthy and active life, because is part of the overall education system (Destriani, 2022). Physical education is one of the subjects that familiarizes a physically active lifestyle as well as the skills possessed and knowledge of physical activity in daily life (Hulfian, 2020). Physical education in schools

can be interpreted as one part of the educational process in order to achieve the goals of education itself (Thosin Waskita et al., 2022). According to the results of research conducted by (Mohamad et al., 2021), it was obtained that physical education subjects have a positive level of effect in learning activities at school, greatly affecting student development. Physical education becomes very important in terms of development and physical activity from childhood to adulthood (Aryanti, 2019). Students have the opportunity to understand the reality of their physical, mental, social well-being and athletic skills which is their future growth potential in physical education learning.

Learning activities, in their implementation, know many terms to describe the way of teaching that will be carried out by teachers. Currently, there are so many kinds of strategies or learning methods that aim to improve the quality of learning for the better. Related to the problem of implementing the latest learning approaches and methods (active student learning models) in Competency Based Curriculum and Education Unit Level Curriculum (Zubaidin et al., 2021). Learning models in physical education include strategies, methods, techniques and learning steps that consider context and content (Ulfa & Kartini, 2021). In the era of information technology advances like today, learning models can be developed is that learning can present various information in forms such as teaching aids, or learning media using images, audio, and video that can be included in internet media such as e-learning (Prastika, 2020). From the learning, it is hoped that students will be able to understand it better. Whether or not learning is effective is seen from several factors, for example, from students who must understand the teaching provided by educators (Seswandi et al., 2022). In learning physical education and school health, there are various sports, such as football, volleyball, basketball, athletics, badminton, swimming, and other sports (Hartati et al., 2020).

Learning effectiveness is very important as a success of students to achieve certain goals that can bring maximum learning results (Destriani et al., 2018). The learning process involves intermediaries to convey messages in the form of knowledge (cognitive), skills (psychomotor), attitudes and positive values (affective), these intermediaries are media and learning resources that greatly support and affect their learning success (Muslimin et al., 2020; Septianti & Frastuti, 2019). Learning media from traditional to modern is to support the learning process in order to achieve goals. The digital-based learning media used in this research is mobile learning-based. The use of mobile learning can make learning flexible because the material presented can be varied, innovative and easy to use (Aryanti, S., Nanda, F. A., & Azhar, 2025).

Based on observations and interviews at State Islamic High School Number 1 Ogan Ilir, during the observation of the learning process in class X Science 1, during the long pandemic many schools conducted online learning but have now begun to adapt to face-to-face learning directly, including Physical Education and Sports Health learning, in the case of practical learning by students using mobile learning applications during the pandemic As with practical learning before the pandemic, therefore there are several problems when learning takes place, namely the lack of enthusiasm of students in participating in badminton learning. There are some students who do not focus on learning because of the monotonous concept of learning.

Based on the problems in the field, the solution that can be provided is by using mobile learning. Mobile learning contains badminton game materials for student that are easy to access. Urgency in this research is the need for badminton learning media that can be accessed using a cell phone. The learning media used in this study can be accessed through the link bit.ly/DownloadSABOM by using a mobile phone/android.

METHOD

This study used the type of Classroom Action Research method. Classroom Action Research is action research conducted or carried out by teachers with the aim of improving the quality of learning implementation in their classes (Markhamah, 2021). The purpose of Classroom Action Research is to improve the quality or quality of the teaching and learning process, so the activity must be in the form of actions that will be believed to be much better than learning activities as usual (Aryanti & Hartati, 2020).

The purpose of Classroom Action Research is to improve the quality of the teaching and learning process, so the activity must be in the form of actions that will be believed to be much better than learning activities as usual. In other words, actions taken to students must look more effective, creative as well as innovative and efficient (Rifatur Rohmah et al., 2023). This research will be carried out at State Islamic High School Number 1 Ogan Ilir number 1 Ogan Ilir, Lintas Timur Km.35 Street, Indralaya District, Ogan Ilir Regency, South Sumatra Province, Zip Code 30662. This research was conducted in the even semester of the 2023/2024 academic year. In this study, the source of the data was students from the State Islamic High School Number 1 Ogan Ilir. The research subjects were 26 people consisting of 15 male students and 11 female students in class X.

The class research procedure consists of initial tests (Pre Cycle), Cycle I, and Cycle II. Data collection techniques in this study with tests, observations, documentation. The data collection instruments used consist of data analysis techniques, learning completeness assessment, observation data analysis, documentation data analysis and success indicators.

RESULTS AND DISCUSSION

Result

Initial Test (Pre Cycle)

The pre-cycle stage (initial test) will be held on August 7, 2023. To begin Classroom Action Research, researchers must first make initial observations complete the period before the pre-cycle (initial test). Pre-cycle is carried out before carrying out cycle I and cycle II actions, pre-cycle is carried out determine the level of understanding of students in the classroom. The observation was made in class X at MAN 1 School Ogan Ilir. Pre-cycle is carried out in the classroom by paying attention to the activeness of students, and paying attention to the teacher teaching.

Table 1. Student Learning Outcomes (Pre-Cycle)

No	Student Name	Value	Information
1.	A S	50	incomplete
2.	A L A	55	incomplete
3.	A A	55	incomplete
4.	A Y W	75	complete
5.	A G	55	incomplete
6.	A S	75	complete
7.	A D D M	75	complete
8.	A R	80	complete
9.	D F A	50	incomplete
10.	D A C	50	incomplete
11.	D A P	65	complete
12.	E A W	75	complete
13.	F R	75	complete
14.	I P	55	incomplete
15.	I W A	65	complete
16.	M R	55	incomplete
17.	M A	55	incomplete
18.	R M	85	complete
19.	M R S	50	incomplete
20.	I K	45	incomplete
21.	R S A	75	complete
22.	R S	55	incomplete
23.	R F	65	complete
24.	A S	50	incomplete
25.	S S S	65	complete
26.	T A	55	incomplete
	Complete amount	1.610	12 complete
	Average	61,9 %	
	Percentage	46,1 %	

Table 2. Frequency of student learning outcomes (Pre-Cycle)

No	Value	Frequency	Percentage	Information
1.	≥ 60-100	12	46,1 %	complete
2.	< 60	14	53,9 %	incomplete
	Sum	26	100	

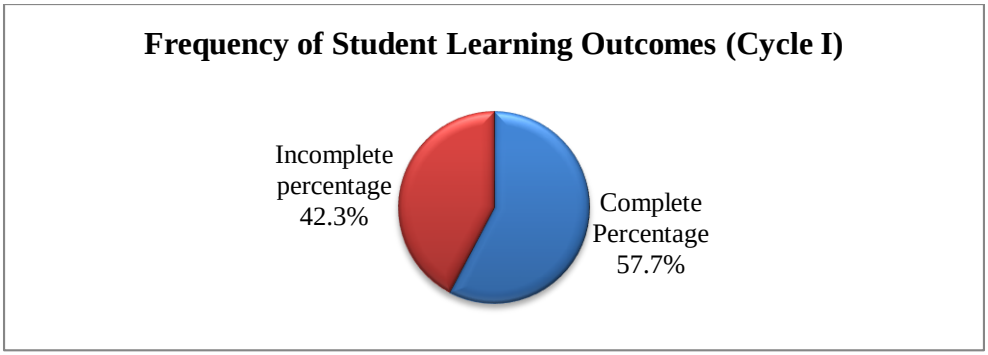
In the table above, it can be seen that of the total 26 students in the initial test (Pre-Cycle) who were completed, there were 12 students with a percentage of 46.1%. For incomplete students, there are 14 students with a percentage of 53.9%. So the classical number of completeness of student learning is 46.1%, therefore it can be classified in the criteria is still low.

Action Cycle I

After doing the first cycle action, the researcher gave 20 questions in the form of multiple choice. Table of student learning outcomes in cycle I as follows:

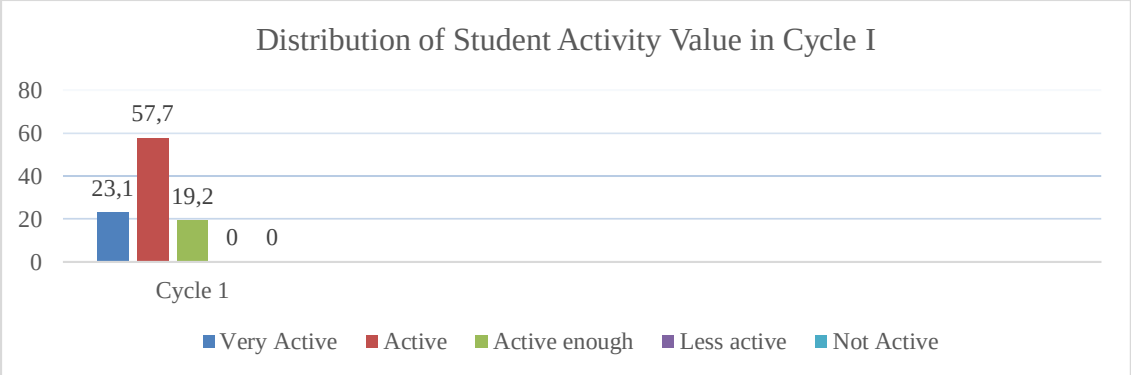
Table 3. Learning Outcomes Of Cycle I Students

No	Student Name	Value	Information
1.	A S	55	incomplete
2.	A D A	75	complete
3.	A A	55	incomplete
4.	A Y W	75	complete
5.	A G	70	complete
6.	A S	75	complete
7.	A D D M	75	complete
8.	A R	90	complete
9.	D F A	55	incomplete
10.	D A C	55	incomplete
11.	D A P	75	complete
12.	E A W	85	complete
13.	F R	80	complete
14.	I P	55	incomplete
15.	I W A	80	complete
16.	M R	70	complete
17.	M A	55	incomplete
18.	R M	75	complete
19.	M R S	55	incomplete
20.	I K	55	incomplete
21.	R S A	80	complete
22.	R S	55	incomplete
23.	R F	75	complete
24.	A S	55	incomplete
25.	S S S	75	complete
26.	T A	55	incomplete
	Complete amount	1.760	15 complete
	Average	67,7 %	
	Percentage	57,6 %	



Picture 1. Frequency Diagram Of Student Learning Outcomes (Cycle I)

From the learning outcomes of students during the first cycle action, it can be seen that the learning outcomes of students in class X at State Islamic High School Number 1 Ogan Ilir in the first cycle action are students who obtain the highest score with a value of 90 and the lowest score with a value of 55. The average score is 67.7%. Students who get complete scores as many as 15 students with a percentage of completeness of 57.7% and incomplete students as many as 11 students with a percentage of 42.3%. Here it can be concluded that the learning outcomes of students in the first cycle action can be said to have not been successful because they have not reached the predetermined success indicator of 80%. Therefore, it is necessary to make improvements in cycle II actions to achieve the predetermined success indicator of 80%.



Picture 2.9 Distribution Of Student Activity Value (Cycle I)

Based on the results of the table above, it can be seen that the number of 26 students there are 6 students getting results with the very active category, as many as 15 students getting the active category, as many as 5 students getting the moderately active category and as many as 0 students getting the less active and inactive categories. Thus, it can be concluded that the level of student activity in cycle I is included in the active category.

The first cycle action carried out has several shortcomings and problems that will be the basis for the second cycle action activities to be carried out, which are as follows: 1) some

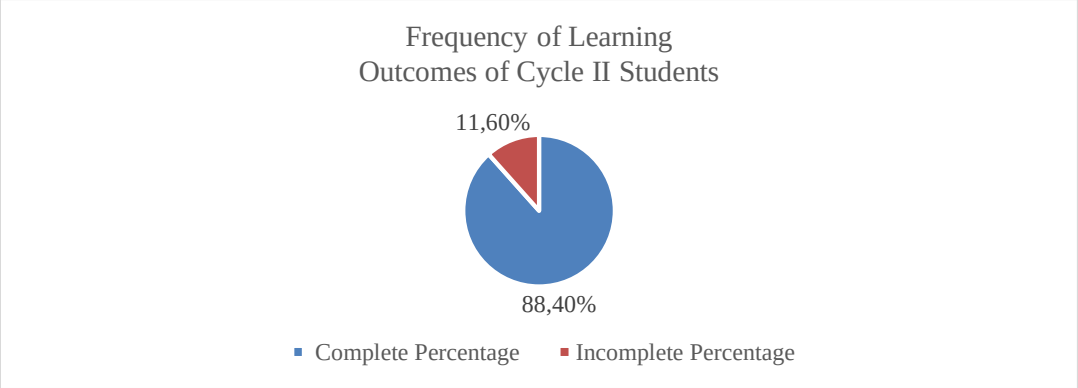
students who do not pay attention when the teacher explains or demonstrates the material, 2) students are less enthusiastic when the material takes place, 3) students are still reluctant to ask questions about the material that students do not understand.

Based on the results of the analysis carried out on cycle I actions, this must be continued with cycle II actions, because there are still many students getting results that are lacking and are still below minimum completion criteria. So the improvements that must be made in the second cycle of actions are: 1) The teacher provides oral reinforcement to students, 2) The teacher chooses one of the students to practice movements for students to more easily understand the material taught.

Action Cycle II

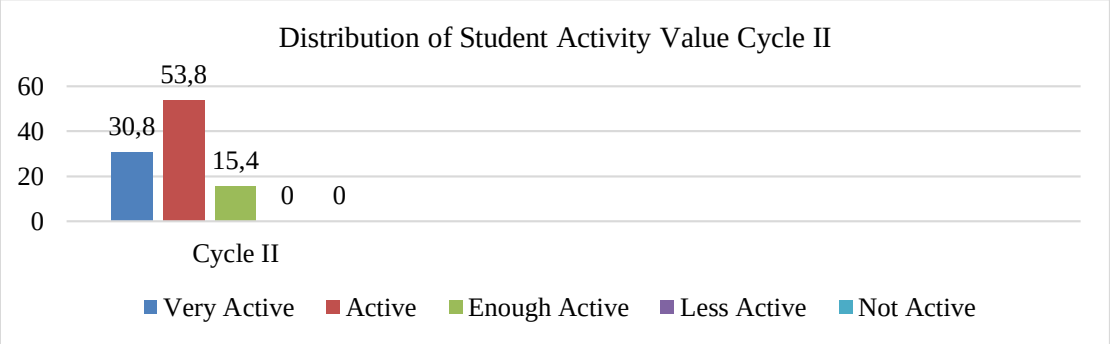
After doing the second cycle of actions, researchers gave 20 questions in the form of multiple choice. Table of student learning outcomes in cycle II as follows:

No	Student Name	Value	Information
1.	A S	85	complete
2.	A D A	85	complete
3.	A A	75	complete
4.	A Y W	80	complete
5.	A G	85	complete
6.	A S	85	complete
7.	A D D M	80	complete
8.	A R	100	complete
9.	D F A	55	incomplete
10.	D A C	75	complete
11.	D A P	85	complete
12.	E A W	90	complete
13.	F R	95	complete
14.	I P	75	complete
15.	I W A	90	complete
16.	M R	75	complete
17.	M A	55	incomplete
18.	R M	80	complete
19.	M R S	55	incomplete
20.	I K	75	complete
21.	R S A	95	complete
22.	R S	75	complete
23.	R F	80	complete
24.	A S	80	complete
25.	S S S	85	complete
26.	T A	85	complete
	Complete amount	2.080	23 complete
	Average	80 %	
	Percentage	88,4 %	



Picture 3. Frequency Diagram Of Learning Outcomes Of Cycle II Students

Based on the learning outcomes of students during the second cycle action, it can be seen that the results of students in class X at State Islamic High School Number 1 Ogan Ilir in the second cycle action are students who get the highest score with a value of 100 and get the lowest score with a value of 55. The average value is 80%. Students who got scores with the complete category were 23 students with a completeness percentage of 88.4% and students who got the incomplete category were 3 students with a percentage of 11.6%. It is concluded that the results of student learning in cycle II actions can be said to be successful because they have achieved predetermined success indicators of 80% with a percentage of student learning results in cycle II which is 88.4%. Therefore, there is no need to continue the next cycle of actions.



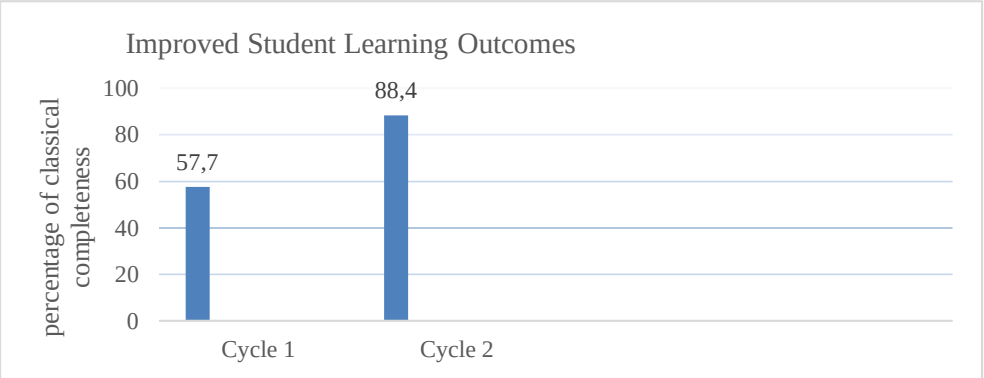
Picture 4. Distribution Of Student Activity Value (Cycle II)

Based on the results in the table above, it is known that from the total of 26 students there were 8 students who got the very active category, as many as 14 students got the active category, as many as 4 students got the moderately active category and as many as 0 students got the less active and inactive category. And it can be concluded that the level of activity of learners in cycle II is included in the active category.

Based on the learning outcomes achieved by students in cycle II get an average of 80%,

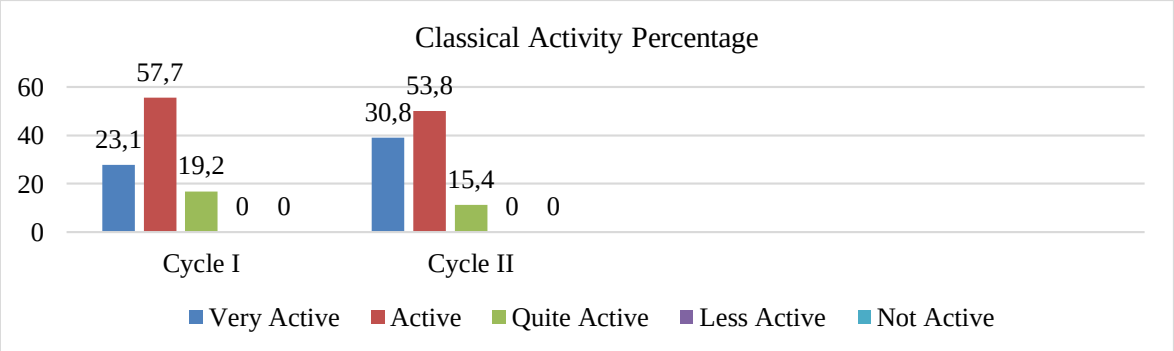
with classical completeness of 88.4%, and the level of student activeness with an average of 72.3%. Therefore, it can be concluded that in the implementation of cycle II has reached the minimum completion criteria of State Islamic High School Number 1 Ogan Ilir for physical education subjects, namely with a value of 60 from the overall completeness of 80%, showing the use of mobile learning media in badminton technique material is effective in learning, so that researchers no longer need to continue the next cycle action because in cycle II actions have been successful or effective in improving student learning outcomes.

If the value of student learning outcomes in cycle I with cycle II can be seen in the form of diagrams, which are as follows:



Picture 5. Diagram of Student Learning Improvement Outcomes (Cycle I & Cycle II)

If the value of student activities in cycle I with cycle II actions can be seen from the bar diagram, which is as follows:



Picture 6. Classical Activity Percentage Chart of Students

Discussion

There is an increase in student learning outcomes from cycle I actions with cycle II actions, so that the overall results of student learning have increased significantly from cycle I to cycle II actions. In improving student learning outcomes, video-based mobile learning can be an indicator of success. The use of video-based mobile learning in learning brings benefits

through improved learning outcomes. According to (Riani Johan et al., 2023), with video-based media, students more easily understand learning material, so that the learning process becomes more effective, and this also ensures students can understand and apply it to learning activities. Meanwhile, according to (Sekar Ayu et al., 2022), the existence of video-based learning media can facilitate the understanding of the concept of student interest in learning because it sees the response of students who are very enthusiastic and enthusiastic in learning. From this it can be concluded that video-based learning media is very effective for use in schools.

From the results of the observation stages on each cyclical action, it can be said that motivation has a very large influence on the success of the learning stages. Mobile learning-based media learning makes students more active or makes students not easily bored, learning with video-based media also makes learning more effective where students more quickly understand the material provided from the video, of course with a balance of practice movements carried out by the teacher during learning. (Fransiska et al., 2021) stated that video has a function as a learning media tool, namely attentional function, affective function, cognitive function and compensatory function.

The benefits of video media are: (1) can foster motivation, (2) the meaning of the message is explained in a way that can be understood by students and allows mastery and achievement of delivery goals. Based on the results of the actions carried out in each cycle, it can be seen that media-based mobile learning material Badminton techniques can improve student learning outcomes and can increase student activeness in teaching and learning activities in the classroom. Mobile learning media for learning is very useful and effective, this mobile learning-based media will also improve learning outcomes or student achievement, mobile learning-based media makes learning more efficient and makes students not easily bored.

With the use of mobile learning has a positive impact on learning. The results of research related to mobile learning (Syafruddin, 2024) through mobile learning have a good impact, namely that students' understanding can be improved. In addition, (Twiningsih, 2022) with the existence of mobile learning, students critical thinking skills can be improved. (Septiana & Kurnia, 2020) the quality of physical education in schools is improved through the use of mobile learning because it has uniqueness, It can be concluded that the use of video-based mobile learning in learning badminton technique material can increase the activeness of students in the classroom.

CONCLUSION

Based on the results of the discussion of research that has been carried out on actions in each cycle, it can be concluded that the learning outcomes of students in class X at State Islamic High School Number 1 Ogan Ilir using video-based mobile learning on technical materials can be said to be effective. This shows that the use of video-based mobile learning in learning badminton technical material can improve student learning outcomes, so that it can be applied in the classroom. The improvement of student learning outcomes is also supported by the results of observing student activeness in pre-cycle actions getting an active percentage of 56.5% with the moderately active category, cycle I getting an activeness percentage of 68.2% with the active category and the results of cycle II actions getting an active percentage of 72.3% with the active category. It can be concluded that the use of video-based mobile learning in learning badminton technique material can increase the activeness of students in the classroom.

REFERENCE

Aryanti, S., Nanda, F. A., & Azhar, S. (2025). Training and Mentoring on the Use of E-Books Based on the Professional Flip PDF Application as Digital Teaching Materials for Physical Education, Sports and Health Teachers in the Independent Learning Curriculum in Palembang City. *Jurnal Pengabdian Masyarakat*, *8*(1), 270–276. https://doi.org/https://doi.org/10.35568/abdimas.v8i1.5609

Aryanti, S., & Hartati, S. (2020). *Learning of Badminton Model through Animation Video on Physical Education Students*. https://doi.org/10.13189/saj.2020.080708

Aryati, V. A. (2019). Pengaruh Permainan Tradisional Terhadap Hasil Belajar Lari Jarak Pendek Siswa Smp Negeri 7 Kota Sukabumi. *Indonesia Sport Journal*, *1*(2), 39. https://doi.org/10.24114/isj.v1i2.16257

Destriana, D., Elrosa, D., & Syamsuramel, S. (2022). KEBUGARAN JASMANI DAN HASIL BELAJAR SISWA. *Jambura Health and Sport Journal*, *4*(2), 69–77. https://doi.org/10.37311/jhsj.v4i2.14490

Destriani. (2022). Efektivitas Penggunaan Media Pembelajaran Bola Voli Berbasis Web di SMANegeri 1 Indralaya Utara. *Braz Dent J.*, *33*(1), 1–12. https://doi.org/https://doi.org/10.31539/jpjo.v8i2.12216

Destriani, D., Giartama, G., Hartati, H., & Victoriand, A. R. (2018). Pengembangan Model Pembelajaran Tematik Integratif Penjasorkes Pada Mata Pelajaran Ilmu Pengetahuan Alam Di Sekolah Dasar. *Sebatik*, *22*(2), 167–171. https://doi.org/10.46984/sebatik.v22i2.334

Fransiska, A., Suhdy, M., & Syafutra, W. (2021). Penerapan Latihan Shuttle Run pada Atlet Lari Jarak Pendek di Club Linggau Runners. *Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*, *5*(1), 40–50. https://doi.org/10.31539/jpjo.v5i1.2872

Hartati, H., Bayu, W. I., & Aryanti, S. (2020). *Effect of 8-Week Circuit Weight Training on Strength*. *21*(Icsshpe 2019), 27–29. https://doi.org/10.2991/ahsr.k.200214.008

Hulfian, L. (2020). Latihan Kelincahan Boomerang Run Dapat Meningkatkan Keterampilan Menggiring Bola Dalam Permainan Futsal. *Jurnal Porkes*, *3*(1), 9–14. https://doi.org/10.29408/porkes.v3i1.1932

Markhamah, N. (2021). Pengembangan Soal Berbasis HOTS (Higher Order Thinking Skills) pada Kurikulum 2013. *Nusantara: Jurnal Pendidikan Indonesia*, *1*(2), 385–418. https://doi.org/10.14421/njpi.2021.v1i2-8

Mohamad, F. R., Hadjarati, H., & Kadir, S. (2021). TINGKAT KEBUGARAN JASMANI RESIMEN MAHASISWA UNIVERSITAS NEGERI GORONTALO DI ERA PANDEMI COVID-19. *Jambura Health and Sport Journal*, *3*(2), 8–14. https://doi.org/10.37311/jhsj.v3i2.11455

Muslimin, Asmawi, M., Samsudin, Dlish, F., Tangkudung, J., Fikri, A., & Destriana. (2020). Model development of digital based volleyball under service skills instruments. *International Journal of Human Movement and Sports Sciences*, *8*(6), 42–46. https://doi.org/10.13189/saj.2020.080707

Prastika, Y. D. (2020). Pengaruh Minat Belajar Siswa Terhadap Hasil Belajar Matematika Siswa Smk Yadika Bandar Lampung. *Jurnal Ilmiah Matematika Realistik*, *1*(2), 17–22. https://doi.org/10.33365/ji-mr.v1i2.519

Riani Johan, J., Iriani, T., & Maulana, A. (2023). Penerapan Model Four-D dalam Pengembangan Media Video Keterampilan Mengajar Kelompok Kecil dan Perorangan. *Jurnal Pendidikan West Science*, *01*(06), 372–378. https://doi.org/https://doi.org/10.58812/jpdws.v1i6.455

Ridlo, Azi Faiz & Saifulloh, I. (2018). Pengaruh Metode Latihan Small Sided Game Terhadap Kemampuan Passing-Stopping Permainan Sepakbola. *Jurnal Research Physical Education*, *IX*(2), 116–121. https://doi.org/https://doi.org/10.33558/motion.v9i2.1591

Rifatur Rohmah, N., Ariyanto, L., & Purwanto. (2023). Penerapan Model Discovery Learning untuk Meningkatkan Pemahaman Konsep dan Minat Belajar Siswa Kelas VII G SMP N 6 Semarang. *2023: Seminar Nasional "Optimalisasi Pkb Melalui Penelitian Tindakan Kelas,"* 2606–2616. https://conference.upgris.ac.id/index.php/psnppg/article/view/3995

Sekar Ayu, N., Redy Susanto, E., & Muhaqiqin. (2022). Rancang Bangun Website Sistem Informasi Manajemen Sewa Lapangan Futsal Damai Futsal Lampung. *Nindi Sekar Ayu, Erliyan Redy Susanto, Muhaqiqin*, *3*(4), 1–6. https://doi.org/https://doi.org/10.33365/jtsi.v3i4.1548

Septiana, R. A., & Kurnia, D. (2020). Penggunaan mobile learning dalam pembelajaran Penjas The use of mobile learning in Physical Education learning. *Journal of Physical and Outdoor Education*, *2*(1), 59–67. https://doi.org/https://doi.org/10.37742/jpoe.v2i1.24

Septianti, D., & Frastuti, M. (2019). Pengaruh Penggunaan Media Berbasis Internet, Motivasi Intrinsik dan Motivasi Ekstrinsik Terhadap Minat Berwirausaha Online Mahasiswa Universitas Tridinanti Palembang. *Jurnal Ilmiah Ekonomi Global Masa Kini*, *10*(2), 130–

138. https://doi.org/10.36982/jiegmk.v10i2.871

Seswandi, S., Haryanto Haryanto, & Hary Palmizal A. (2022). Pengembangan Video Teknik Dasar Penjaga Gawang Futsal Putri. *Jurnal Manajemen Pendidikan Dan Ilmu Sosial*, *3*(2), 1206–1218. https://doi.org/10.38035/jmpis.v3i2.1366

Syafruddin, M. A. (2024). Penerapan Mobile Learning Dalam Pendidikan Jasmani Dan Olahraga. *Jurnal Ilmiah Penjas*, *10*(1), 2775–7609. https://doi.org/https://doi.org/10.36728/jip.v10i1.3183

Thosin Waskita, D., Mochamad Surya, C., & Febriana, R. (2022). Kemampuan Motorik Kasar Melalui Teknik Permainan Lari Estafet Pada Anak Usia 3-4 Tahun. *Jurnal Tahsinia*, *3*(1), 53–62. https://doi.org/10.57171/jt.v3i1.312

Twiningsih, A. (2022). Penggunaan Media Ispring Suit Berbasis Mobile Learning Pada Pembelajaran Matematika Untuk Meningkatkan Keterampilan Berpikir Kritis Siswa Kelas 3 SD. *Edudikara: Jurnal Pendidikan Dan Pembelajaran*, *7*(3), 138–144. https://doi.org/10.32585/edudikara.v7i3.292

Ulfa, D., & Kartini, K. (2021). Analisis Kesalahan Siswa dalam Menyelesaikan Soal Logaritma Menggunakan Tahapan Kesalahan Kastolan. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(1), 542–550. https://doi.org/10.31004/cendekia.v5i1.507

Victorian, A. R., Bayu, W. I., & Waluyo, W. (2020). Survei Pelaksanaan Pembelajaran Pendidikan Jasmani Dan Olahraga Selama Pandemi Covid-19. *Bravo's : Jurnal Program Studi Pendidikan Jasmani Dan Kesehatan*, *8*(4), 161. https://doi.org/10.32682/bravos.v8i4.1748

Zubaidin, Syah, H., & Wibawa, E. (2021). The Influence of Target Games on Shooting Ability in Football Games at SSB Kembang Putra Aikmel. *Sports and Health Education Study Program, Faculty of Sports and Health Sciences, Madalika Education University.*, *1*(1), 39–48. https://doi.org/http://dx.doi.org/10.36312/sfj.v1i1.5