RESEARCH
www.commprac.com
ISSN 1462 2815

DEVELOPMENT OF PHYSICAL FITNESS EXERCISE MEDIA BASED ON ANDROID APPLICATIONS

Sepriadi [1]*, Syafruddin [2], Khairuddin [3], Alnedral [4], Muhamad Sazeli Rifki [5], Bafirman [6] and Eldawaty [7]

[1, 2, 3, 7] Department of Physical Education, Sports Science Faculty, Universitas Negeri Padang, Indonesia.
[4] Department of Sport Coaching, Sports Science Faculty, Universitas Negeri Padang, Indonesia.
[5, 6] Department of Sport Science, Sports Science Faculty, Universitas Negeri Semarang, Indonesia.
*Corresponding Author Email: sepriadi@fik.unp.ac.id

DOI: 10.5281/zenodo.8362574

Abstract

The purpose of this study was to develop an android-based physical fitness training media. Where the training media developed can be used to assist users in carrying out exercises that aim to improve physical fitness. This study was research and development, where the development research procedure is simplified into seven main steps according to the needs, namely: (1) Conducting an analysis of the needs of the product to be developed, (2) Developing the initial product, (3) Expert validation, (4) Revision of validation results, (5) Field trials, (6) Revision of trial results, and (7) Manufacture of final products. In this study, 2 experts were used to assess the training media developed, namely experts in the fields of: Physical Fitness and Media and Information Technology. Total samples were 24 people. Data collection for expert validation of the media and applications was developed by using a questionnaire. The questionnaire was used to obtain a value for the feasibility of training media and applications developed from experts. The results of the study were: 1) The results of the expert validation of the product development media for Android-based physical fitness training were obtained from media experts by 91.13% included in the very feasible category. 2) The results of the reliability test were 0.91 and included in the high category of reliability. It can be seen that the physical fitness training media product was included in the very valid and reliable category so it is ideal for use in physical fitness training.

Keywords: Android, Exercise, Media, Physical Fitness.

INTRODUCTION

Physical fitness is one of the things that is very important for humans because in a fit body, we will be able to carry out daily activities easily without experiencing fatigue. Fitness is a condition where a person does not easily feel tired when doing work or physical tasks (Agus et al., 2021; Sepriadi et al., 2020); (Sepriadi, S., & Eldawaty, 2019); (Putro et al., 2018). Physical fitness is a series of physical characteristics owned or achieved by someone related to the ability to perform physical activity (Haskell et al., 2000). Physical fitness is not only beneficial for skills, but also beneficial for health. Physical fitness consists of components that are grouped into groups related to health and skills (Safarina; et al., 2021). Health-related physical fitness is related to cardiovascular endurance, muscle strength and endurance, flexibility and body composition. Meanwhile, fitness related to motor skills is related to agility, balance, coordination, reaction time, speed and accuracy (Chen et al., 2016); (Sukamti, E. R., Zein, M. I., & Budiarti, 2016).

A fit body is a body that has a static and dynamic degree of health that is able to support all activities in daily life without excessive fatigue, and fatigue will soon recover

after resting (Tan et al., 2021). The higher the degree of a person's physical fitness, the greater his physical work ability and the less likely fatigue occurs. So that person is said to have a high degree of physical fitness. Physical fitness is a person's condition at a certain time. The state of one's physical fitness is not permanent, but the quality increases due to regular exercise and will decrease if no longer doing exercise.

Physical fitness is an indicator in the development of superior human resources. Physical fitness can be achieved if people have a good level of health. However, many people don't care about their health especially their physical fitness. This is because many people are busy with work activities. There are several factors that affect physical fitness, namely: 1) Heridity, 2) Exercise, 3) Gender, 4) Age, 5) Body fat, 6) Activity, 7) Nutritional intake, 8) Lifestyle, and 9) Health (Sharkey, 2003). It was further explained that the factors that affect physical fitness. Physical fitness is influenced by various factors including type of work, health conditions, gender, age, exercise, learning motivation and nutritional status (Sepriadi, S., & Eldawaty, 2019). Based on this opinion, it can be seen that one of the factors that influence physical fitness is exercise. People who have low physical fitness will be more susceptible to various diseases such as degenerative diseases and are also susceptible to viruses. One very good way to improve physical fitness is with exercise. However, at this time some people are lazy to do exercises because fitness exercises are considered boring because there is no easy and fun training media.

Android applications are useful for helping us in doing our daily work (Gore, 2017). Android application is an opportunity for developers offered by the rapid development of information and communication technology. Android applications can be created and developed by anyone according to the goals and objectives of the user. Complete components embedded in Android include boot loaders, device drivers, and library functions, to the API (Software Development Kit) and available Android SDK application development (Swara & Ramadhan, 2017). Android is a software used on mobile devices. (Maji; et al., 2010); (CALIMAG et al., 2014). The Android operating system can be illustrated as a bridge between the device (device) and its use, so that users can interact with the device and run the applications available on the device (Bläsing; et al., 2010).

Currently, there are various applications that can help with fitness training, such as Nike+, GoEco Runtastic, Strava, MapMyFitness, Runkeeper Running, and many other applications (Bucher et al., 2016); (Hirsch et al., 2014); (Stragier, J., & Mechant, 2013); (Wu, Y., Kankanhalli, A., & Huang, 2015). The applications that have been developed can be used as a medium that helps in doing fitness exercises because with these applications you can track the number of exercises that have been done, the number of calories that have been spent, the amount of distance that has been covered to the number of steps that have been taken by utilizing several sensors such as, GPS and pedometer. However, the application that the researcher designed and developed has advantages and differences compared to other applications. Where in this developed application can control the training load. The advantages of this application can be used by the user to control the exercise directly, where if the user controls the load manually then they will not know directly whether the exercise is in accordance with the expected load so they know whether the exercise is in accordance with the principles physical fitness training or not. In addition, the advantage of the application that the researcher designed is the existence of models or forms of exercise those users can do as exercises to improve physical fitness. In addition, researchers can

also determine the maximum capacity or maximum load to be achieved. Users can also add their own forms of exercise because in this application it is given convenience for users to add forms of exercise as desired. It can be concluded that the application is more useful compared to other applications.

MATERIAL & METHOD

Study Design

This research was research development (research and development). This research was conducted to develop training media to improve physical fitness in the form of an android application. The development procedure in this study adopts from the development research stages which include: (1) research and information gathering, (2) planning, (3) developing the initial product, (4) main field testing, (5) main product revision, (6) main field trials, (7) operational product revisions, (8) operational field trials, (9) final product revisions, and (10) dissemination and implementation (Borg, Walter R. & Gall, 2003). In this study, the research procedure was simplified into several steps where the development research procedure according to Borg & Gall is simplified (Puslitjaknov, 2008). It is simplified into seven main steps, namely: (1) Conducting an analysis of the needs of the product to be developed, (2) Developing the initial product, (3) Expert validation, (4) Revision of validation results, (5) Field trials, (6)) Revision of test results, and (7) Manufacture of final products.

Participant

In the study, 2 experts were used to assess the training media developed, namely experts in: 1. Physical Fitness 2. Media and Information Technology. The total samples were 24 people.

Statistical Analysis

Data collection for expert validation of the media and applications developed used questionnaire. The questionnaire was used to obtain a value for the feasibility of training media and applications developed from experts. The type of questionnaire used is a closed questionnaire, namely a questionnaire that contains the answer choices that have been made. The researcher's instrument grid is an adaptation of several questions in the research (Herrmann et al., 2017).

It was used to determine the validity of experts through descriptive analysis techniques in the form of percentages. Where the experts were asked to assess and provide answers based on a questionnaire that had been prepared in the expert validation instrument. The questionnaire used for experts was in the form of a number of aspects that must be assessed for feasibility. From the results obtained, the percentages were then classified to obtain the conclusions of the developed model. Expert validity was classified into several categories like table 1.

Table 1: Expert Validity Classification

Persentage	Criteria
0 - 20,0	Not valid
20,1 - 40,0	Very low
40,1 - 70,0	Moderate
70,1 - 90,0	High
90,1 – 100	Very high

Source: (Guilford, 1956)

Meanwhile, the instrument reliability test was conducted after the validity criteria were obtained. The reliability test of the instrument was determined by the test-retest method on different days, where an assessment of the training model practiced by students on different days was conducted by 2 judges. The reliability of the model was classified into several categories, as listed in table 2.

Table 2: Classification of Reliability

Interval Class	Category
0.93 - 1.00	Very high
0.88 - 0.92	High
0.68 - 0.87	Moderate
0.00 - 0.67	Low

Source: (Kirkendall. D. R.. Gruber. J. J.. & Johnson. R. E., 1987).

RESULT

Based on the assessment of the validity of the test from 2 experts namely, 1) Physical Fitness, 2) Media and Information Technology, the results of the validity of the experts were obtained as in the following table:

Table 3: Expert Validity Results

No	Experts	Persentage (%)	Classification
1	Physical fitness	91,75	Very suitable
2	Media and Information Technology	90,50	Very suitable
	Average	**91.13**	**Very suitable**

Based on the table above, it can be seen that the developed media is suitable for use as a training medium to improve physical fitness. After testing the validity and also a slight revision of the media that was developed, a reliability test was carried out. After the reliability test was carried out through expert assessment by evaluating the training media that the tester practiced, the reliability value was 0.91 and was classified as high and could be used to improve physical fitness.

Table 4: Results of the Reliability of the Training Media

No	Experts	Reliability	Category
1	Physical fitness	0.91	High
2	Media and Information Technology	0.91	High
	Average	**0.91**	**High**

The final goal in this study is an android-based training media to improve physical fitness. In this developed media, it is expected that it can improve the physical fitness of the user when doing exercises such as those in the training media. In addition, this media can be used to control training load directly, so that it can be seen whether the training load that has been carried out is in accordance with the principles of physical fitness training or not. In addition, the advantage of the application that the researcher designed is that the researcher can independently determine the maximum capacity or maximum load to be achieved. Even users can also add their own forms of exercise because in this application it is given convenience for users to add forms of exercise as desired.

In this study, according to the stages arranged in development research, it begins with a preliminary study. The purpose of the preliminary study in this study was to examine

and examine various matters related to physical fitness. Preliminary studies carried out research through various methods such as by conducting a needs analysis in the field which found that many could not do the exercises according to the training load they should have.

The forms of android-based training media to improve physical fitness that have been compiled are as follows:

1. The Beginning

This section is the landing page. When users don't have an account yet, they can register by clicking on the list menu and if you already have an account, just click login as shown in picture 1. The list menu contains personal data from the user such as name, email, password, gender and date of birth as shown in the picture 2. This section also contains steps if the user forgets the password to enter the application as shown in figure 3. Where later the user only has to enter the email that was registered before and later a link will be sent to verify the password reset to that email.

2. Introductory Menu

In this menu, after the user enters the application, several menus will be displayed. They are the introductory menu, training program, training history and stopwatch. The introductory menu contains an explanation of physical fitness, components of physical fitness and other matters related to physical fitness. This can be seen in Figure 4.

Figure 1: Landing Page

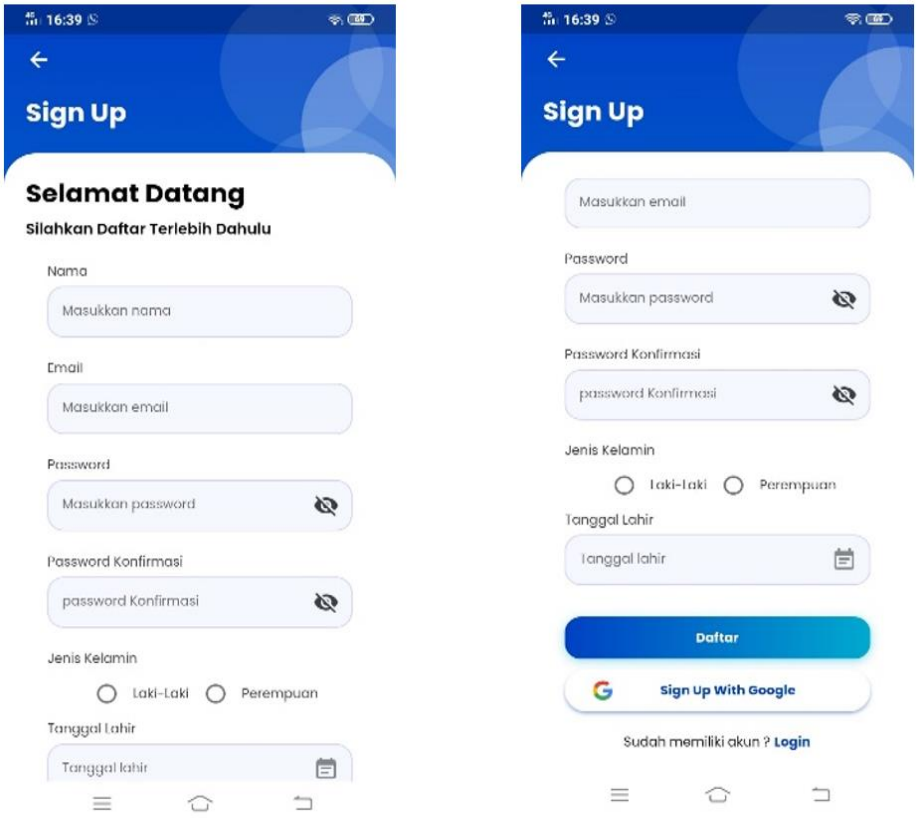

Figure 2: Registration Menu

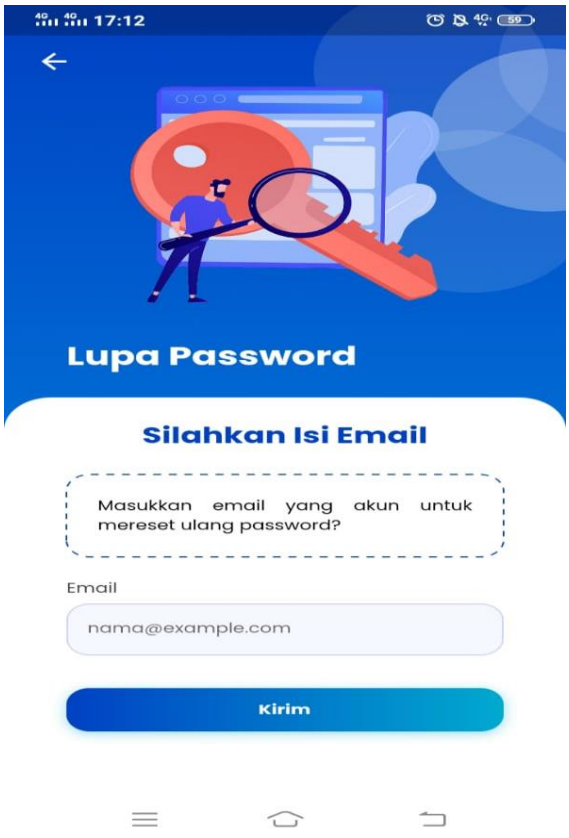

Figure 3: Forget Password Menu

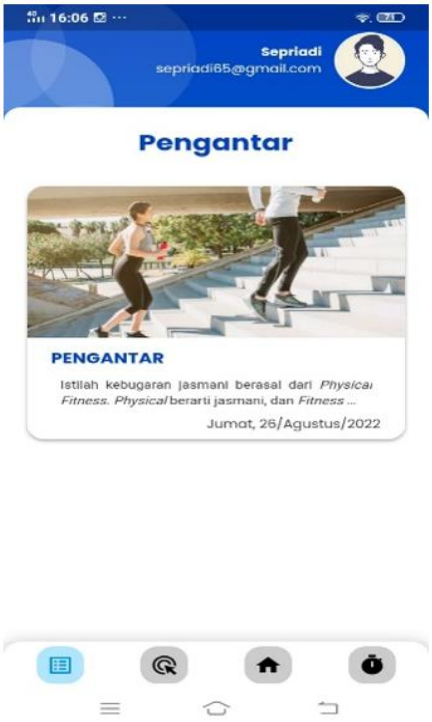

Figure 4: Introduction Page

3. Exercise Program Menu

Next, entering the training program menu (figure 5) contains the forms of exercise that can be performed in the explanation section as shown in Figure 6. This menu also contains the maximum training load performed as well as the training load performed. So that later this exercise will appear whether the load is correct or still not according to what is recommended as shown in Figure 7-9. This section also contains conclusions and suggestions if the training is not on target, it will be suggested, such as increasing the intensity if the results of the conclusion of the training load are still lacking or reducing the intensity if the training load exceeds the maximum limit.

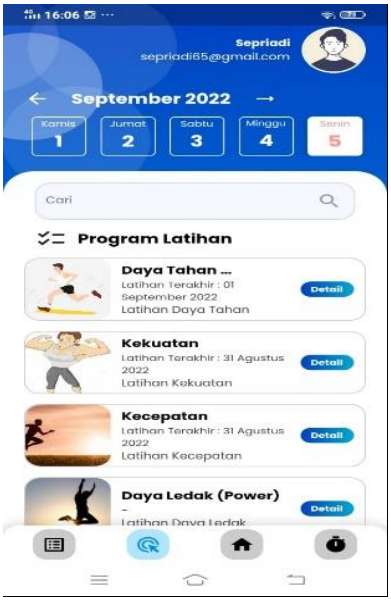

Figure 5: Exercise Menu

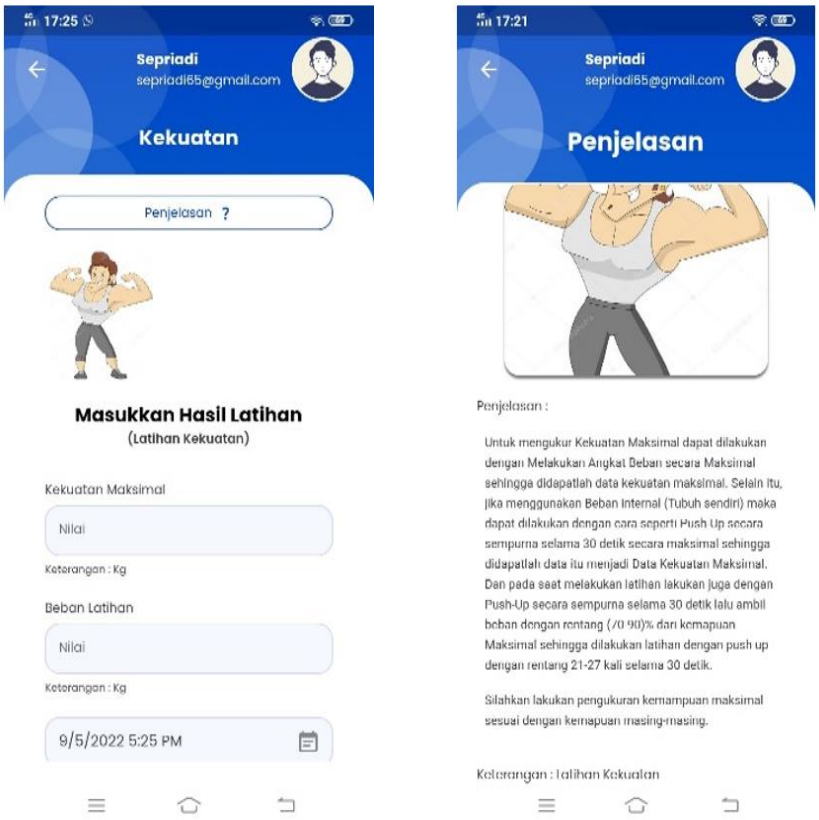

Figure 6: Exercise Information

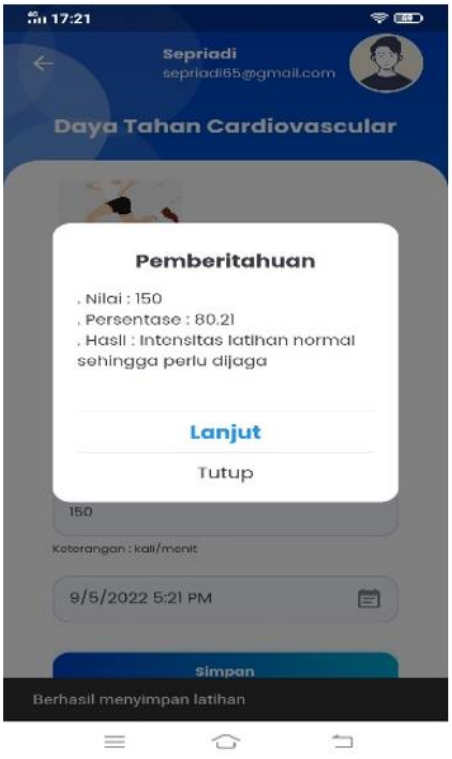

Figure 7: Conclusion of Appropriate Workload

Figure 8: Conclusion Of Maximum Workload

Figure 9: Conclusion of Unachieved Workload

4. Exercise History Menu

The exercise history section displays the results of previous exercises. In this section can also be selected according to the previous training date as desired. As in figure 10.

5. Menu Stopwatch

The final menu section contains a stopwatch page (figure 11). This page can be used as an aid in measuring time. So that in 1 application it can be used in carrying out exercises as expected.

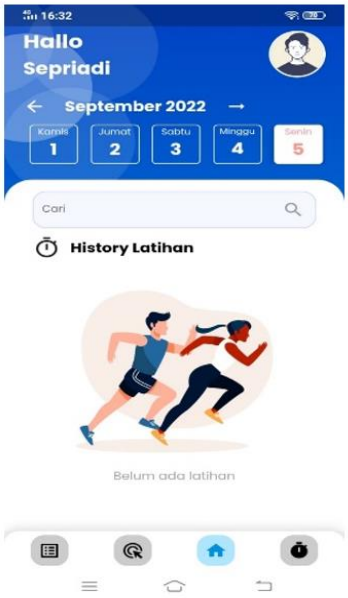

Figure 10: History Of Exercise

Figure 11: Stopwatch Menu

DISCUSSION

In this development research, it creates a physical fitness training development product that is packaged in an Android-based interactive media. The use of interactive learning media can be adapted to the objectives of the exercise. Interactive media is a training medium that is used to channel messages so that they can stimulate thoughts, feelings, attention, and motivation (Firdaus et al., 2020; Kurniawan et al., 2022). This training media has a goal, namely to improve the physical fitness of users who use Android-based physical fitness applications. The results of this research and development are in the form of Android-based physical fitness training media. With this interactive training media, it can help users in the process of increasing physical fitness training.

Physical fitness according to (Darmawan, 2017; Hambali et al., 2019; Mashud, 2019) is an important component that shows a person's physical ability, looks fit and healthy

and does not feel excessive fatigue when doing physical activity. The physical activity carried out is of course various types of activities, such as work, sports, personal activities and other activities. By having good physical fitness, of course the activities carried out will be carried out well. In other words, physical fitness has an important role for humans in carrying out daily activities. A healthy person does not necessarily have a fit body, but a fit person definitely has a healthy body, therefore it is important to improve physical fitness to get a healthy and fit body.

Android application-based physical fitness training media products have several characteristics, namely: (1) the product is an application, (2) the product presents an exercise program, (3) the product presents a summary of the training program, (4) the product presents a training history, (5) the product has time measurement tool.

The application developed is in the form of physical fitness training media based on an Android application and can be accessed using an Android smartphone. Training media is an object in electronic or non-electronic form that can assist the training process in the form of structured, planned, repetitive physical activity and aims to improve one or more components of physical fitness (Budiman, 2013; Jaelani et al., 2023; Kustandi & Darmawan , 2020; Lengkana & Muhtar, 2021; Riki et al., 2022; Sagala & Daulay, 2020). In this application there is an exercise program that can be used to improve fitness. The output of this application is that the training intensity reaches the required training load, the training intensity exceeds the maximum load or the training intensity does not meet the required training load. This application is very helpful for users to be able to find out the intensity of the exercises carried out have fulfilled, exceeded or less than the required training load, because the results of the exercises carried out by the user are already in the conclusion menu in the application. This application can be operated using an android device. On Android devices, it can be downloaded via the Play Store with Android OS 4.4 and newer. With this application it makes it easy for users to be able to find out the intensity of the training load carried out whether it has met, exceeded or lacked. Therefore this application can increase user motivation in improving physical fitness.

This application can be done for all age levels, from teenagers to adults. With no age limit for using this application, this product can support exercise to improve physical fitness. Physical fitness is a person's physical condition in carrying out physical activities in order to improve the quality of life in every physical activity without feeling significant fatigue and still having the energy to be able to carry out other physical activities (Idham et al., 2022; Mahfud et al., 2020; Rumpoko et al., 2020; al., 2022; Sepriadi et al., 2023; Wulandari & Jariono, 2022). Calculation of the intensity of physical fitness training is measured by inputting personal data such as age and also the training load carried out so that the results will be in accordance with the training load requirements of the users of this application. This application has a training history manual service, where this training history can view the user's previous training history as a guide in improving physical fitness. This exercise history can be used as a reference whether the user should increase the intensity of the exercise, reduce the intensity of the exercise or even be the same as the intensity of the exercise previously performed. This reference can certainly motivate users to be able to improve and maintain their physical fitness. This application also has a service feature on the application menu in the form of a stopwatch to measure the time while doing exercises.

In this application there are menu options for physical fitness training programs including: endurance training, strength training, speed training, explosive power training, agility training, flexibility training, coordination training, and balance training. All forms of modern fitness training are arranged in one physical fitness training program menu. Each form of exercise carried out by the application user can find out the training load obtained through the menu explaining the forms of exercise. From the menu explaining the form of training the user will find out the conclusion of the training load that has been carried out. The conclusion of the training load contains values, percentages, and results of training intensity. If the training intensity exceeds the maximum load, the conclusion of the training load will appear a notification related to the excess load so that the training load needs to be reduced. If the training intensity does not reach the training load, a notification will appear regarding the training intensity that needs to be increased again. After the user has done physical fitness training, the training history can be seen in the training history menu. In the last menu there is a stopwatch menu which can be used as an aid in measuring time.

Applications designed and developed by researchers have advantages and differences from other applications. Where this application can control the training load so that the user knows the training load that has been carried out has reached the requirement, exceeding the requirement or even less than the user's requirement. This application can also be used to control exercises directly, which can be seen from the results of exercises that have been carried out by the user at that time, so that the user knows whether the exercises carried out are in accordance with the principles of physical fitness training or not. In addition, the advantage of the application that the researcher designed is the existence of models or forms of exercise that users can do as exercises to improve physical fitness. Researchers can also determine the maximum ability or maximum load to be achieved. Even users can also add their own forms of exercise because in this application it is given convenience for users to add forms of exercise as desired. According to the researcher, the application is more advantageous compared to other applications.

It was found that the results of expert validation of the product development of Android-based physical fitness training media obtained from media experts amounted to 91.13% included in the very feasible category. Then in the reliability test the results obtained were 0.91 and included in the high category of reliability. So, it can be seen that the creation of physical fitness training media products is included in the very valid and reliable category so that it is ideal for use in physical fitness training.

With the results of expert validation, it indicates that the Android-based physical fitness training media application is running well and in accordance with what the researchers expected. It is hoped that the results of research products on physical fitness training media based on Android applications can help increase interest, motivation and interest in improving physical fitness.

CONCLUSION

Based on expert validation tests and reliability tests through field trials related to Android-based physical fitness training media, it was concluded that the developed media were valid and reliable to improve physical fitness. The training media can be used by users as a medium that can assist in doing exercises to improve physical fitness.

Acknowledgments

The authors would like to thank the Padang State University Research and Community Service Institute for funding this work with a contract number 815/UN35.13/LT/2022.

Conflict of interest

The authors declare no conflict of interest.

References

1) Agus, A., Wellis, W., Sepriadi, S., Wulandari, I., & Sari, M. (2021). The effect of consuming iron supplements and continuous running exercises on the increasing level of hemoglobin. *Gazz Med Ital - Arch Sci Med*, *180*(7), 753–757. https://doi.org/10.23736/S0393-3660.21.04678-7

2) Bläsing;, T., Batyuk;, L., Schmidt;, A.-D., Camtepe;, S. A., & Albayrak, S. (2010). An Android Application Sandbox system for suspicious software detection. *5th International Conference on Malicious and Unwanted Software*. https://doi.org/10.1109/MALWARE.2010.5665792

3) Borg, Walter R. & Gall, M. . (2003). *Educational Research: An Introduction* (7th ed.). Longman.

4) Bucher, D., Cellina, F., Mangili, F., Raubal, M., Rudel, R., Rizzoli, A. E., &, & Elabed, O. (2016). Exploiting Fitness Apps for Sustainable Mobility-Challenges Deploying the GoEco! App. *4th International Conference on ICT for Sustainabili*, 89–98.

5) Budiman, W. (2013). Pengaruh Model Pembelajaran Kooperatif Tipe Jigsaw dan Motifasi Belajar terhadap Prestasi Belajar Ilmu Fisiologi Olahraga. *Jurnal Pendidikan Indonesia*, *2*(1), 138–144. https://doi.org/10.3102/0013189X18785613

6) Calımag, J. N. V., Mıguel, P. A. G., Conde, S., R., Aquıno, &, & B., L. (2014). Ubıquıtous Learnıng Envıronment Usıng Androıd Mobıle Applıcatıon. *Impact: International Journal of Research in Engineering & Technology*, *2*(2), 119–128.

7) Chen, W., Mason, S., Hammond-Bennett, A., &, & Zalmout, S. (2016). Manipulative skill competency and health-related physical fitness in elementary school students. *Journal of Sport and Health Science*, *5*(4), 491–499. https://doi.org/https://doi.org/10.1016/j.jshs.2015.03.007

8) Darmawan, I. (2017). Upaya meningkatkan kebugaran jasmani siswa melalui penjas. *JIP*, *7*(2), 143–154.

9) Firdaus, R. I., Kurniawan, A. W., & Heynoek, F. P. (2020). Pengembangan Pembelajaran Kebugaran Jasmani Unsur Kelincahan Berbasis Multimedia Interaktif Di Sma Negeri 1 Turen. *Gelanggang Pendidikan Jasmani Indonesia*, *3*(2), 130. https://doi.org/10.17977/um040v3i2p130-143

10) Gore, S. et all. (2017). *Survey Paper on An Android Based Mobile Framework for Student Alert*.

11) Guilford, J. P. (1956). *Fundamental Statistic in Psychology and Education. 3rd Ed* (3rd ed.). McGraw-Hill Book Company, Inc.

12) Hambali, R. M., Kusmaedi, N., & Jajat, J. (2019). Tingkat Kebugaran Jasmani Lansia Dikaji Berdasarkan Tingkat Partisipasi dan Gender. *Jurnal Keolahragaan*, *5*(2), 1. https://doi.org/10.25157/jkor.v5i2.2150

13) Haskell, W. L. ., &, & Kiernan, M. (2000). Methodologic Issues in Measuring Physical Activity and Physical Fitness When Evaluating the Role of Dietary Supplements for Physically Active People. *The American Journal of Clinical Nutrition*, *72*, 541–550. https://doi.org/https://doi.org/10.1093/ajcn/72.2.541S

14) Herrmann, L. K., &, & Jinsook, K. (2017). The fitness of apps: a theory-based examination of mobile fitness app usage over 5 months. *Mhealth*, *3*.

15) Hirsch, J. A., James, P., Robinson, J. R., Eastman, K. M., Conley, K. D., Evenson, K. R., &, & Laden, F. (2014). Using MapMyFitness to place physical activity into neighborhood context. *Frontiers in Public Health*, *2*(19).

16) Idham, Z., Neldi, H., Komaini, A., Sin, T. H., & Damrah, D. (2022). Pengaruh Kebugaran Jasmani, Status Gizi, dan Motivasi Belajar terhadap Hasil Belajar PJOK. *Jurnal Basicedu*, *6*(3), 4078–4089.

https://doi.org/10.31004/basicedu.v6i3.2196

17) Jaelani, K., Wahidah, I., & Zaman, I. B. (2023). Pengembangan Medıa Latıhan Teknık Dasar Indoor Hockey Berbasıs Aplıkası Androıd. *Intelektiva*, *4*(6), 1–12.

18) Kirkendall. D. R.. Gruber. J. J.. & Johnson. R. E. (1987). *Measurement and Evaluation for Physical Educators*. Human Kinetics Publishers.

19) Kurniawan, A. W., Surya, K. K. H., & Kurniawan, R. (2022). Pengembangan Media Pembelajaran Aktivitas Kebugaran Jasmani Unsur Kelentukan Berbasis Multimedia Interaktif di Sekolah Menengah Pertama. *Jurnal Patriot*, *4*(1), 25–35.

20) Kustandi, C., & Darmawan, D. (2020). *Pengembangan Media Pembelajaran Konsep & Aplikasi Pengembangan Media Pembelajaran Bagi Pendidik di Sekolah dan Masyarakat*. Kencana.

21) Lengkana, A. S., & Muhtar, T. (2021). *Pembelajaran Kebugaran Jasmani*. CV. Salam Insan Mulia.

22) Mahfud, I., Gumantan, A., & Nugroho, R. A. (2020). Pelatihan Pembinaan Kebugaran Jasmani Peserta Ekstrakurikuler Olahraga. *Wahana Dedikasi : Jurnal PkM Ilmu Kependidikan*, *3*(1), 56. https://doi.org/10.31851/dedikasi.v3i1.5374

23) Maji;, A. K., Hao;, K., Sultana;, S., & Bagchi, S. (2010). Characterizing Failures in Mobile OSes: A Case Study with Android and Symbian. *IEEE 21st International Symposium on Software Reliability Engineering*. https://doi.org/10.1109/ISSRE.2010.45

24) Mashud. (2019). *Variasi dan Kombinasi Dasar Gerak Renang* (A. Kristiyandaru (ed.)). Prodi. PJ JPOK FKIP ULM Press.

25) Puslitjaknov, T. (2008). *Metode Penelitian Pengembangan*. Depdiknas.

26) Putro, A. A., Suherman, A., & Sultoni, K. (2018). Aplikasi Program Kebugaran Daya Tahan Kardiovakular Berbasis Android. *Jurnal Terapan Ilmu Keolahragaan*, *3*(1), 1–11.

27) Riki, R., Purnomo, E., & Perdana, R. P. (2022). Pengembangan Media Video Tutorial Gerakan Seni Tunggal Tangan Kosong Pencak Silat. *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa (JPPK)*, *11*(6), 436. https://doi.org/10.26418/jppk.v11i6.55867

28) Rumpoko, S. S., Jayanti, K. D., Febrianti, R., Hakim, A. R., Sunjoyo, & Sestiasih, V. S. (2022). Tingkat Kebugaran Jasmani Mahasiswa Prodi Pendidikan Olahraga. *Jurnal Porkes*, *5*(1), 260–271. https://doi.org/10.29408/porkes.v5i1.5635

29) Safarina;, R., Athar;, &, & Kahr, M. (2021). Analısıs Kebugaran Jasmanı Yang Berhubungan Dengan Kesehatan Anak Usıa 10- 12 Tahun Dı Kampung Hıjau Pada Wılayah Lahan Basah Kota Banjarmas. *Jurnal Pendidikan Jasmani Dan Olahraga*, *2*(3).

30) Sagala, R. S., & Daulay, D. E. (2020). Pengembangan Media Bantu Latihan Bertahan Pada Bola Voli Tahun 2019. *Journal Coaching Education Sports*, *1*(2), 115–126. https://doi.org/10.31599/jces.v1i2.371

31) Sepriadi, S., & Eldawaty, E. (2019). Journal of Physical Education , Sport , Health and Recreations. *The Contribution of Hemoglobin Levels to Students' Physical Fitness*, *8*(2), 82–90. https://doi.org/https://doi.org/10.15294/active.v8i2.30237

32) Sepriadi, Jannah, K., & Eldawaty. (2020). The effect of jogging exercise to improve hemoglobin levels. *Journal of Physics: Conference Series*, *1481*, 12028. https://doi.org/10.1088/1742-6596/1481/1/012028

33) Sepriadi, Syafruddin, Khairuddin, Ihsan, N., Eldawaty, Zulbahri, Juniar, S. R., & Pratiwi, M. D. (2023). Relationship Between Physical Fitness and Mental Health on Physical Education Learning Outcomes. *Educational Administration: Theory and Practice*, *29*(1), 137–146.

34) Sharkey. (2003). *Kebugaran Kesehatan*. PT. Raja Grafindo Persada.

35) Stragier, J., & Mechant, P. (2013). Mobile fitness apps for promoting physical activity on Twitter: the# RunKeeper case. *Etmaal van de Communicatiewetenschap*, 1–8.

36) Sukamti, E. R., Zein, M. I., & Budiarti, R. (2016). Profil Kebugaran Jasmani dan Status Kesehatan Instruktur Senam Aerobik di Yogyakarta. *Jurnal Olahraga Prestasi*, *12*(2).

37) Swara, G. Y., & Ramadhan, S. J. (2017). Sistem informasi geografis penyebaran lokasi lembaga bimbingan belajar di kota padang berbasis android. *Jurnal Teknoif Teknik Informatika Institut Teknologi Padang*, *5*(2), 50–56.

38) Tan, Q., Ye, M., Ma, A. J., Yip, T. C.-F., Wong, G. L.-H., & Yuen, P. C. (2021). Importance-aware personalized learning for early risk prediction using static and dynamic health data. *Journal of the American Medical Informatics Association*, *28*(4), 713–726. https://doi.org/https://doi.org/10.1093/jamia/ocaa306

39) Wu, Y., Kankanhalli, A., & Huang, K. W. (2015). Gamification in fitness apps: How do leaderboards influence exercise? *Gamification in Fitness Apps Thirty Sixth International Conference on Information Systems 14th*, 1–12.

40) Wulandari, W., & Jariono, G. (2022). Jurnal Porkes (Jurnal Pendidikan Olahraga Kesehatan & Rekreasi) Jurnal Porkes (Jurnal Pendidikan Olahraga Kesehatan & Rekreasi). *Jurnal Porkes*, *5*(1), 245–259. https://doi.org/10.29408/porkes.v5i1