



## Designing Android Based Physical Activities and “Lafit” to Increase Physical Fitness Level of Elderly

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### Abstract

*the elderly so that they can do physical activities anywhere and anytime with the aim of improving their physical fitness so that by increasing their physical fitness then their immune level will also increase so that it can reduce the risk of being exposed to viruses, especially the corona virus. This goal is also to create a special TKJI test application for the elderly so that the elderly can measure their own physical fitness level. The specific target of this research is the people of Laut Dendang Village aged 60 years and over. This application contains learning tutorials to do safe and fun physical activities for the elderly completed with tutorials on how to do physical fitness tests that are packaged in an attractive android application so that they can be accessed by the elderly through their smartphones anytime and anywhere. This research used research and development method by borg and gall through 10 steps from potential and problem until mass production. This research involves FIK Unimed lecturers as models in making videos that contain material for physical activity movements that are safe for the elderly and the videos in this application will be made in a simple and clear way and will go through the editing process using specific software. This research showed that the physical fitness of the elderly people increased considerably.*

**Keywords:** Elderly, Fitness Test, Physical Activity, Android, Pandemic

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#### Artikel Info:

Submitted: 21/04/2022

Revised: 16/05/2022

Accepted: 24/05/2022

Published: 28/05/2022

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**How to Cite:** Aufan, R., Handoko, A, H. (2022). Designing Android Based Physical Activities and “Lafit” to Increase Physical Fitness Level of Elderly. *Journal Coaching Education Sports*, 3(1), 113-124. <https://doi.org/10.31599/jces.v3i1.1129>.

**Author’s Contribution:** a) Research Design; b) Data Collection; c) Statistical Analysis; d) Preparation of Manuscripts; e) Fund

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## **A. Introduction**

With age, the body will experience various declines due to the aging process, ranging from decreased production of hair color pigments, hormone production, skin elasticity, muscle mass, bone density, tooth strength, to the function of body organs ([A. Sulaeman, 2015](#)). Certain physical activities are also one factor that can improve a person's health and can encourage a person to have a longer life span.

Statistical data obtained from various countries shows that some groups of the elderly have a higher risk of infection with the coronavirus. For example, the countries most affected by COVID-19 are countries that have a large percentage of elderly people. Various data from several countries also shows the same thing. In the United States, for example, 35% of COVID-19 cases there are those over the age of 65 ([WHO Indonesia, 2020](#)).

In addition to being susceptible to infection, elderly people are also very susceptible to experiencing severe symptoms or the risk of complications and even death from COVID-19. Based on data from the WHO, more than 95% of deaths due to the coronavirus come from the age group over 60 years of age. Then, more than 50% of those who experience severe symptoms are aged over 80 years old. In

addition to the decreased ability of the immune system, the number of elderly people who had chronic (comorbid) diseases before being infected with the coronavirus was also a factor in the high mortality rate in their age group. For example, in Australia, 4 in 5 elderly people have at least one chronic disease, such as diabetes, hypertension, or cancer. ([Baker et al., 2016](#)) mention in their article that changes in modern lifestyles where consuming high levels of sugar and salt and low physical activity can lead a person, especially those who have entered the elderly stage, to chronic disease.

This vigilance for the elderly vulnerable group is also a concern in handling COVID-19, as stated in the Minister of Home Affairs Circular Number 440/2622/SJ concerning the Establishment of the Task Force for the Acceleration of Handling Corona Virus (Covid-19) on March 29, 2020 ([Mendagri, 2020](#)). The population of Laut Dendang Village is 17,333 people, with a male population of 8,790 and a female population of 8,543. The population density level is 10,196 people/km<sup>2</sup> ([Kotakusumut, 2016](#)). From this data, it can be seen that the population of Laut Dendang Village is quite dense. This may be because Laut Dendang Village is an alternative village for residents around Medan to build buildings or settle because this village is not

so far from the city of Medan and land prices, are still relatively affordable for the public.

Furthermore, in Laut Dendang Village itself, the population belonging to the elderly category is quite large, at around 1000 people, consisting of 500 men and 500 women. Conditions in Laut Dendang Village are also not what they used to be, where there are still many large and comfortable fields as a means for the residents of Laut Dendang Village to exercise, such as playing football or just walking around the field. The environmental conditions in this village are classified as densely populated settlements where, in the last 10 years, many new housing complexes have been built in Laut Dendang village. The positive impact of this development is that the village is developing, many SME business actors have sprung up, and many new jobs have been created. However, on the one hand, the negative impact of this development is the reduction of vacant land that was once often used by the community for physical activities such as playing soccer or other types of sports. Another side effect of this phenomenon is the lack of socialization among residents. Most of the immigrants come from the city and have extraordinary activities, so the habits they used to have, such as playing badminton at night in the

field they made themselves and using simple equipment, are slowly being eroded. and it could be said to have almost disappeared at this present moment.

The local government also pays less attention to the quality and quantity of sports facilities and infrastructure in the village. Until now, no sports facilities and infrastructure have been built that can be used and utilized by the general public for sports such as jogging tracks, fitness equipment such as those in the Merdeka Field in Medan City, and so on. So the villagers do not know where to exercise, and in the end, they prefer to spend time at home without doing any physical activity.

The result of this new trend that has developed in Laut Dendang village has caused the fitness level of the residents there, especially the elderly or people aged 60 and over, to fall. This is because they rarely do sports or other physical activities. Especially the elderly, who are people with reduced physical abilities or are not as strong as they used to be, can not do all sports activities as young people can.

As is well known, sports that are suitable for the elderly are gymnastics, yoga, and walking. Unfortunately, many elderly people are less interested in physical activities than mentioned above. Meanwhile ([Sunde et al., 2021](#)), physical activity or physical activity is one of the

best methods to prevent an elderly person from experiencing a disability or decreased ability to move in daily life. The same thing was also expressed by ([Blumenthal et al., 2017](#)), who concluded that the higher a person's physical activity, aerobic fitness, and disciplined diet, the better their neurocognitive ability as an elderly person.

Not only teenagers and adults, but also the elderly are very fond of this smartphone because they can access the internet for the latest news, view videos on provider sites such as YouTube, and actively manage their social media accounts to greet their old friends virtually. So, it is not uncommon for the elderly to spend approximately 2 to 3 hours a day using their smartphones. This not only makes them less mobile but also further lowers their fitness level.

From the phenomena stated above, this research was carried out with the aim of developing an attractive and safe physical activity design for the elderly and building an Android application-based Elderly Fitness Test (LAFIT) so that the elderly can improve their physical fitness as well as measure their level of physical fitness.

Of the various problems that exist, a solution that allows the elderly to be able to overcome problems in terms of their level of physical fitness or physical fitness was found. The solution is in the form of making software or media in the form of applications on smartphones based on

Android, which can be seen and studied by simply pressing the application icon on the smartphone of the elderly.

According to ([Alaska & Hakim, 2021](#)), physical fitness is the ability and ability of the body to make adjustments (adaptations) to the physical liberation given to it (from daily work) without causing excessive fatigue. Physical fitness must link various factors, called general factors, including the provision of open space, increasing human resources, and community participation to cultivate a healthy life through sports activities.

According to Pasaribu & Mashuri (2019), the components of physical fitness include 10 components, as follows: (1) Strength, (2) Endurance, (3) Muscular Power, (4) Speed (Speed), (5) Flexibility, (6) Agility, (7) Coordination, (8) Balance, (9) Accuracy, (10) Reaction (reaction).

In the physical fitness workshop held in 1984, the "Indonesian Physical Fitness Test" (TKJI) was agreed upon and set to be an instrument/test kit that is applicable throughout Indonesia because TKJI is prepared and adapted to the conditions of Indonesian children. TKJI is divided into 4 age groups, namely: 6–9 years, 10–12 years, 13–15 years, and 16–19 years.

It should be understood that the test items in the TKJI are standard and should not be inverted, with the order in which the tests are carried out as follows: (1) run 60

meters (aged 16-19 years). (2) hanging lifts jumps, and (5) 1200 meters (16-19 years for men (pull-ups) (3) Sit-ups, (4) Vertical old).

**Table 1**  
**TKJI for male 16-19 years old**

Nilai	Lari 60 meter	Gantung angkat tubuh	Baring duduk	Loncat tegak	Lari 1200 meter	Nilai
5	S.d – 7,2"	19 - Keatas	41 - Keatas	73 Keatas	s.d – 3'14"	5
4	7.3" – 8,3"	14 – 18	30 – 40	60 – 72	3'15" – 4'25"	4
3	8,4" – 9,6"	9 – 13	21 – 29	50 – 59	4'26" – 5'12"	3
2	9,7" – 11,0"	5 – 8	10 – 20	39 – 49	5'13" – 6'33"	2
1	11,1" dst	0 - 4	0 – 9	38 dst	6'34" dst	1

Source: Nurhasan, 2013:64

As discussed above, the standardized form of TKJI can only be applied to a young age group, and, of course, the results will be different if applied to the elderly age group or people aged 60 years and over. Therefore, a test was created specifically to measure the level of physical fitness of the elderly. This particular test is called the Senior Fitness Test in the original language because it was made in America.

The Senior Fitness Test was developed as part of the LifeSpan Wellness Program at Fullerton University (Rikli & Jones, 2013). Because of this, this test is sometimes known as the Fullerton Functional Test. This is a simple and easy-to-use test form to measure the fitness level of people belonging to the elderly age category. This test describes an easy-to-

understand and effective test to measure aerobic fitness, strength, and flexibility using minimal and inexpensive equipment. This fitness level test item involves general activities such as getting up from a chair, walking, lifting, bending, and stretching. The tests were developed to be safe and fun for older adults while still meeting scientific standards for reliability and validity. The following is a form of a physical fitness test for the elderly that has been validated and is suitable for use:

1. Chair Stand Test—Measures lower body strength
2. Arm Curl Test—Measures upper body strength
3. Chair Sit and Reach Test—measures lower body flexibility.
4. Back Scratch Test—measures upper body flexibility

5. 8-Foot Up and Go Test—measures flexibility
6. Walk Test (6 minutes) or Step in Place Test (2 minutes) — The walking test is used to assess aerobic fitness unless the person uses an orthopedic device while walking or has difficulty with balance, in which case they perform a step-in-place test.

The use of smartphones or gadgets maybe something new in the world of education. However, it is seen that the use of smartphones as a learning medium is very good because people will find it easier to find the material or knowledge they need and can also provide opportunities and freedom for the general public to access any material widely that may not have been material before. taught in places of formal education ([Supratman, 2018](#)). The use of smartphones as learning media will also provide new experiences for the wider community participants and the use of smartphones as learning media will make it easier for people to learn, because of their simple form and wide access so

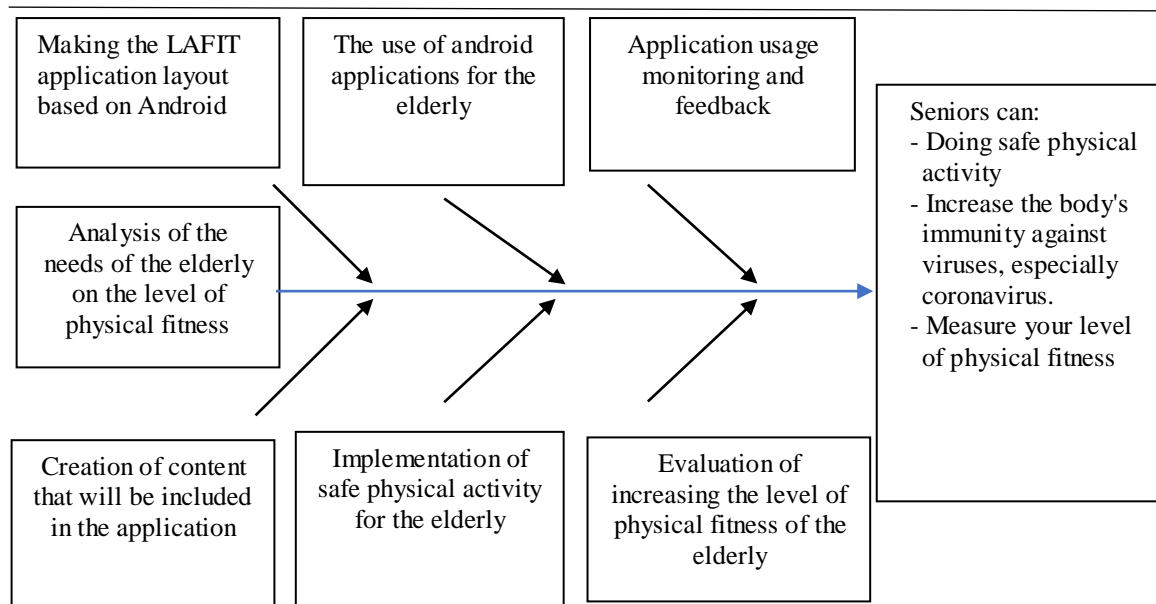
that smart trees are easy to use anytime and anywhere ([Alaska & Hakim, 2021](#)).

([Maulana et al., 2018](#)) explains that mobile learning is learning through mobile wireless technology that allows everyone to access information and learning materials from anywhere and anytime. Learners can manage themselves when they want to learn and from where they want to learn. So that people have the right to access learning materials and information to improve their quality of life regardless of where they live, their status, and their culture.

## **B. Method**

This research was carried out in Laut Dendang Village and the subjects of the study were people who were included in the category of Elderly (elderly) with an age range of 60 years and over.

To maximize research results, in this activity, follow the procedures or steps that have been made previously to facilitate the research steps as shown in the image below.



Gambar 1. Diagram Fishbone

This research was conducted in Laut Dendang Village, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra Province. The time needed to carry out this research is 3 months starting in June 2021 and ending in September 2021.

The research subjects consisted of media validation subjects and test subjects. The media validation subjects included one material expert and one media expert, 5 peer reviewers, and two lecturers in public health sports courses.

Product trials consist of small-scale trials and large-scale trials. The subject of a small-scale trial will be carried out with 4 elderly subjects aged 60 years and over. While on a large-scale trial scale, this study will require research subjects as many as 27 people with the same category as subjects on a small scale, namely the elderly aged 60 years and over.

This research uses research and development methods or often called Research and Development (R&D). Research and development is a research method to develop and test products in the world of education. In addition to developing and testing products, this research is used to discover new knowledge regarding fundamental phenomena, as well as educational practices. Functioning to find fundamental phenomena is done through basic research. Then for research on educational practices, applied research is conducted.

The research uses a research model adapted from the ADDIE development model (Analysis, Design, Develop, Implement, and Evaluate). The ADDIE model began to exist in the 1990s which was developed by Dick and Carry.

This development research is a research with a procedural model, which shows the steps of the product development process. Product development in this research is in the form of training and learning media. The developed media will be assessed by media experts, material experts, and the elderly as users of the training media. So it is hoped that this media can be used as a reference source for physical activity activities to improve the physical fitness of the elderly throughout Indonesia.

### **C. Result and Discussion**

#### **Result**

The development of a video learning model of safe physical activity movements for the elderly is written in the form of a script or storyboard script that presents step by step shown in the tutorial motion of physical activity movements so that the results obtained are in accordance with what was planned.

After the learning media has been created, the material expert validation is carried out. Material expert validation is used to assess the material that has been prepared in the application media for safe physical activity movement tutorials for the elderly. There are two aspects that are assessed, namely the learning aspect and the content aspect. The learning aspect is assessed to determine whether the material presented is in accordance with the basic competencies and the content aspect is to

determine whether the content of the material is clear in its presentation.

The number of validation scores on the learning aspect by material experts is 35 with 9 indicators, so the average assessment result from material experts is 3.8. Referring to the conversion table, the results of the assessment from material experts in the learning aspect are good.

The number of validation scores for media experts on the display aspect is 48 out of 11 indicators, so the average result of the material expert assessment is 4.3 with a very good category. Referring to the conversion table, the assessment of the aspect of the display is **very good**.

The number of validation scores for media experts on programming aspects is 36 out of 8 indicators, so the average result of the material expert assessment is 4.5 with a very good category. Referring to the conversion table, the assessment of the programming aspect is very good.

The trial of this product was carried out on August 4 2021, at the Badminton court located at the Unimed Lecturer Housing in Laut Dendang Village, Percut Sei Tuan District. This product trial is specifically for people who fall into the category of Elderly (elderly) or who are over 60 years old.

Before the elderly used interactive multimedia-based exercise media and filled out the questionnaires that had been



provided, the research team first explained to the elderly how to fill out questionnaires and explained about interactive multimedia-based exercise media. The product trial involved 4 elderly people with several considerations, both in terms of the conditions of the current implementation of Community Activity Restrictions (PPKM) and in terms of the number of subjects that were not too many.

The trial of interactive multimedia-based learning media products was included in the "very good" category with an average value of 4.4 elderly assessment results from 15 indicators involving 4 elderly people. After testing the product, the next step is to implement the product.

The large group trial stage is the final stage and is carried out after the product has been developed. The large group trial stage is a product trial for the elderly who are willing to be subjects in this study. Before the elderly filled out the questionnaire, the research team first explained interactive multimedia-based learning media based on Android and the indicators contained in the questionnaire. The trial of this product involved 27 people over the age of 60.

The number of assessment scores based on large group field trial data involving 27 elderly with 15 indicators was 1855 so the average assessment result based on the

results of the Ciba test was 4.6. Referring to the conversion table, interactive multimedia-based learning media on the basic competencies of describing management information systems according to the elderly's response is very good.

## **Discussion**

Material expert validation was carried out to assess 2 aspects, namely the training aspect and the content aspect. Based on the results of the first stage of the assessment of the learning aspect, an average score of 3.8 was obtained and was categorized as good. The assessment consists of 9 question indicators, then the content aspect gets an average score of 3.8 and is categorized as good, the assessment consists of 10 indicators. Overall the average rating is 3.8. After revisions are made according to the advice of material experts, a staged assessment is carried out

Stage 2 assessment of the learning aspects obtained an average score of 3.7 and is categorized as good. The assessment consists of 9 indicators while the content aspect gets an average score of 4 and is categorized as good. Overall, the average assessment by material experts is 3.8. The results of the assessment fall within the range of  $3.4 < X < 4.2$  with a good category.

So that the feasibility level of interactive multimedia-based learning media based on material expert validation is in a good category so that the media is suitable for use as training media for the elderly.

Media expert validation was carried out to assess 2 aspects, namely the training aspect and the content aspect. Based on the results of the stage 1 assessment of the display aspect, an average score of 3.7 was obtained and was categorized as good. The assessment consists of 11 question indicators, then the programming aspect gets an average score of 3.6 and is categorized as good, the assessment consists of 8 indicators. Overall the average rating is 3.7.

After revisions were made according to the advice of media experts, a stage 2 assessment was carried out. Stage 2 assessment of the display aspect obtained an average score of 4, 3 and was categorized as very good. The assessment consists of 11 indicators while the programming aspect gets an average score of 4.5 and is categorized as very good. Overall, the average assessment by material experts is 4.4. The results of the assessment are in the range of  $X < 4.2$  with a very good category. So that the feasibility level of interactive multimedia-based learning media based on the validation of media experts is in the very good category,

the media is worthy of being used as a training medium for the elderly.

The trial phase was carried out in 2 stages, namely small group trials and large group trials. The aspect that was assessed in the trial was the aspect of using learning media. Based on a small group trial conducted by 4 elderly people, an average score of 4.3 was obtained. Referring to the conversion table, the average small group trial falls in the range of  $X < 4.2$  with a very good category.

Then a large group trial was carried out by 27 elderly people, the average score was 4.6. Referring to the conversion table, the average of large group trials is in the range of  $X < 4.2$  with a very good category. So that the feasibility level of the media based on the assessment of the elderly is in a good category, the media is feasible to be used as a training medium for the elderly.

#### **D. Conclusion**

Based on the needs analysis and research activities that have been carried out up to approximately 70%, the layout and form of the LAFIT application have been completed and have gone through several stages of revision or improvement based on input from experts.

Based on the results of research activities that have been carried out on the development of android applications whose purpose is to increase the level of

physical fitness of the elderly, this application is very ready to be tested on the elderly who are in Laut Dendang Village, Percut Sei Tuan District, Deliserdang Regency, North Sumatra Province. . to see the extent of the impact of using the LAFIT application there is an increase in the physical fitness of the elderly.

### E. Acknowledgment

This research was carried out because it received financial assistance from the internal parties of the Medan State University so the research team would like to express their deepest gratitude to the Medan State University.

### F. Conflict Interest

There is no conflict of interest in this journal being published.

### Reference

- A. Sulaeman. (2015). Pengembangan Kurikulum 2013 Dalam Paradigma Pembelajaran Kontemporer. *Islamadina*, XIV(1), 71–95. <https://doi.org/10.30595/islamadina.v0i0.1669>
- Alaska, A., & Hakim, A. A. (2021). Analisis Olahraga Tradisional Lompat Tali dan Engklek Sebagai Peningkatan Kebugaran Tubuh di Era New Normal. *Jurnal Kesehatan Olahraga*, 09(01), 141–150. <https://ejournal.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/download/40928/36256>
- Baker, J. S., Dos Santos, L., Davies, B., Ciolac, E. G., & Bocalini, D. S. (2016). Approaches in Physical Activity: From Basic to Applied Research. *BioMed Research International*, 2016. <https://doi.org/10.1155/2016/6498624>
- Blumenthal, J. A., Smith, P. J., Mabe, S., Hinderliter, A., Welsh-Bohmer, K., Browndyke, J. N., Lin, P.-H., Kraus, W., Doraiswamy, P. M., Burke, J., & Sherwood, A. (2017). Lifestyle and Neurocognition in Older Adults With Cardiovascular Risk Factors and Cognitive Impairment. *Psychosomatic Medicine*, 79(6), 719–727. <https://doi.org/10.1097/PSY.0000000000000474>
- Kotakusumut. (2016). *Profil BKM Amanah Desa Laut Dendang* (Vol. 4, pp. 1–23).
- Maulana, A., Azhari, A., & Darmawan, A. (2018). Pengembangan Model Latihan Renang Berbasis Mobile Learning Untuk Mahasiswa Pendidikan Jasmani ., *Bravo's Jurnal*, 6(4), 150–155.

<http://www.ejournal.stkipjb.ac.id/index.php/penjas/article/view/973>

Mendagri. (2020). *Surat Edaran Menteri Tentang Pembentukan SATGAS Covid 19* (pp. 1–2).

<http://www.hukumonline.com/pusatdata>

Rikli, R. E., & Jones, C. J. (2013). *Senior Fitness Test Manual* (2nd ed.). Library of Congress Cataloging-in-Publication Data.

Sunde, S., Hesseberg, K., Skelton, D. A., Ranhoff, A. H., Pripp, A. H., Aarønæs, M., & Brovold, T. (2021). Associations between health-related quality of life and physical function in older adults with or at risk of mobility disability after discharge from the hospital. *European Geriatric Medicine*, 12(6), 1247–1256.

<https://doi.org/10.1007/s41999-021-00525-0>

Supratman, L. P. (2018). Penggunaan Media Sosial oleh Digital Native. *Jurnal ILMU KOMUNIKASI*.

<https://doi.org/10.24002/jik.v15i1.1243>

WHO Indonesia. (2020). Coronavirus Disease Ikhtisar Kegiatan - 8. *World Health Organization*, 19(May), 2.

<https://covid19.who.int/>