

Android-Based Application for Supporting Aerobic Exercise of Mosesahi Gymnastics

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Abstract: *Mosesahi gymnastics is physical exercises developed from aerobic exercises in 2015 to increase lung capacity and cardiovascular ability. The criteria mentioned in Law No. 3 Year 2005 Article 19 Paragraph 1 on recreational sport applies to Mosesahi gymnastics, being exercises that are performed as part of the process to regain health and fitness. Performing fitness exercises requires the presence of an instructor or guide who possesses the knowledge and skills to perform fitness exercises. The aim of this article is to explain theoretically the possibility of developing a design for an Android-based Mosesahi gymnastics application.*

Keywords: *mosesahi, gymnastics, aerobic, exercise, android, application*

I. Introduction

Mosesahi gymnastics is exercises that were developed in 2015 from aerobic exercises to increase lung capacity and cardiovascular ability [1]. *Mosesahi* comes from sayings in the Gorontalo language, “*mo’o sehati*” and “*mo’sanangi hilawo*” (healthy and happy). The design of the movements of *Mosesahi* gymnastics was made by analyzing the muscles that are exercised; this was performed in order that *Mosesahi* gymnastics can achieve the desired goals.

Mosesahi gymnastics is characterized by physical aerobic activities performed to increase a person’s level of fitness. Aerobic activities may occur with the presence of oxygen, which is part of the aerobic metabolism. The word “aerobic” comes from the Greek words *aer*, which means “air” and *bios*, which means “life” (“living in air”) [2]. Physical activities that are considered “aerobic” have two characteristics: 1) causing our body to function optimally during a period of 20-30 minutes, and 2) attractive, making those who perform this activity to repeat the aerobic movements [3].

Law No. 3 Year 2005 Article 19 Paragraph 1 mentions the criterion that also applies to *Mosesahi* gymnastics, as exercises to improve health and fitness [4].

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In order to increase their level of fitness, people who perform physical aerobic activities will be able to train several areas of fitness, namely 1) lungs and heart (cardiovascular) endurance and muscular endurance, 2) muscle strength, 3) agility, 4) flexibility, 5) explosive power, 6) speed, 7) balance, and 8) coordination [5].

The performance of fitness exercises requires the presence of an instructor or guide who possesses the knowledge and skills of fitness exercises, as stated in Article 19 Paragraph 5 of Law No. 3 Year 2005.

In recent years, many mobile fitness applications that can function as an instructor or guide have been developed through a series of studies. Nike+, GoEco Runtastic, Strava, MapMyFitness, and Runkeeper Running are examples of the applications that have been successfully developed and very much aids the performance of physical activities to increase fitness [6][7][8][9]. The aim of this article is to provide a theoretical explanation on the possibility of designing an Android-based *Mosesahi* gymnastics application.

II. Aerobic Exercise

Aerobic exercises are categorized into aerobic physical activities. Aerobic physical activities are performed gradually (in stages) and continuously, using the energy produced by burning calories with oxygen without causing fatigue, such as, by walking, jogging, cycling, and swimming [10].

Many benefits can be gained through aerobic exercises. Aerobic exercises may affect bodily immunity against diseases. A study was conducted in Mangelang on 60 women, comprising 30 women who participated in aerobic exercises and 30 women who did not perform aerobic exercises as control. The data analysis utilized the Mann-Whitney U-Test. The results of the study indicated that there were significant differences with $z = 3.803$, $p < 0.05$, and an average of 84.80 for those who took part in aerobic exercise, while those who did not take part in aerobic exercises had an average of 77.03 [11]. Various efforts can be taken to address the symptoms and complaints among menopausal women, one of them being low-impact aerobic exercises. Based on a study on 56 menopausal women respondents who performed low-impact aerobic exercises, there was an increase in the score of living quality, compared to those who did not perform low-impact aerobic exercises with a $p\text{-value} < 0.05$ [12].

There was a significant effect of aerobic exercise on flexibility ($p = 0.002$) and heart and lung endurance ($p < 0.001$), wherein flexibility could increase from 33.78 cm to 36.45 cm and heart and lung endurance could increase from 18.48 to 22.08 [13].

There are three kinds of aerobic exercises: low-impact, mixed- or medium-impact, and high-impact. The differences are that 1) there are significant effects among high-impact, mixed-impact, and low-impact aerobic exercises on the increase of the physical efficiency index (sig. $0.000 < 0.05$); 2) there is an increase in physical efficiency index with high, medium, and low resting heart rates (sig. $0.000 < 0.05$); and 3) the interaction between the intensity of aerobic exercises and resting heart rates has no impact on the increase in physical efficiency index (sig. $0.683 < 0.05$) [14]. The performance of either low-impact or high-impact aerobic exercises has a significant impact on physical fitness, and high-impact aerobic exercises gives better results compared to low-impact aerobic exercises on physical fitness [15].

III. Mosesahi Gymnastics

Mosesahi comes from expressions in the Gorontalo language “*mo’o sehati*” and “*mo’sanangi hilawo*” (healthy and happy). *Mosesahi* gymnastics is a series of exercises that were developed from aerobic exercises in 2015 to increase lung capacity and cardiovascular ability. The movements of *Mosesahi* gymnastics were designed the the analysis of the muscles that are utilized in the movements of the gymnastics.

A study was done on *Mosesahi* gymnastics involving 72 students divided into 9 groups with different frequencies and durations: 1) once a week for 20 minutes, 2) once a week for 30 minutes, 3) once a week for 40 minutes, 4) twice a week for 20 minutes, 5) twice a week for 30 minutes, 6) twice a week for 40 minutes, 7) three times a week for 20 minutes, 8) three times a week for 30 minutes, and 9) three times a week for 40 minutes; the exercise intensity of each group was gradually increased from 60% in the first month to 70% in the second month and 80% in the third month [16].

Tabel 1: Sample characteristic and kind of treatment

Frequency (per week)	Duration		
	20 min Overload principle on exercise intensity per month (60%, 70%, 80%)	30 min Overload principle on exercise intensity per month (60%, 70%, 80%)	40 min Overload principle on exercise intensity per month (60%, 70%, 80%)
1	8 people	8 people	8 people
2	8 people	8 people	8 people
3	8 people	8 people	8 people

Figure 1. Sample characteristics and types of treatment

Significant changes on lung capacity and cardiovascular ability resulted from *Mosesahi* gymnastics with a frequency of twice a week for 20 minutes with 60%, 70%, and 80% intensities compared to once a week, as well as three times a week for 30 minutes at 60%, 70%, and 80% compared to once or twice a week. In addition, *Mosesahi* gymnastics performed with a frequency of three times a week for 40 minutes gradually to 80% intensity showed better improvement compared to *Mosesahi* gymnastics for 40 minutes at frequencies of once and twice a week.

The recommendation for beginners who desire to become healthy and fit is to perform *Mosesahi* gymnastics with for 20 minutes twice a week with 50-60% intensity. Students, employees, and the public who wish to exercise to support their daily activities should perform *Mosesahi* gymnastics with a duration of 30 minutes, at a frequency of three times a week and 60%, 80%, and 50% intensities respectively.

The Phenomenon of Android-Based Applications for Fitness Exercises

Android-based applications for cardiovascular endurance fitness programs have been previously successfully developed through research and development. In the developed applications, there are three

primary features, which are to provide education on fitness, to assist in VO2Max testing, and to create a cardiovascular endurance fitness exercise programs in an automatic manner [17].

Several exercise applications have been developed that serve as a surrogate fitness instructor, which allows those who do not have time to go to a fitness center to be able to train by themselves at home. The following are eight fitness applications that can help people perform fitness exercises easily at home [18]:

1. Home Workout – No Equipment

Home Workout – No Equipment provides a variety of exercises that can train muscles of the chest, stomach, shoulders, and back. In addition, dietary planning is provided for users of the application who also wish to go on a diet program.

1. Home Workout - No Equipment

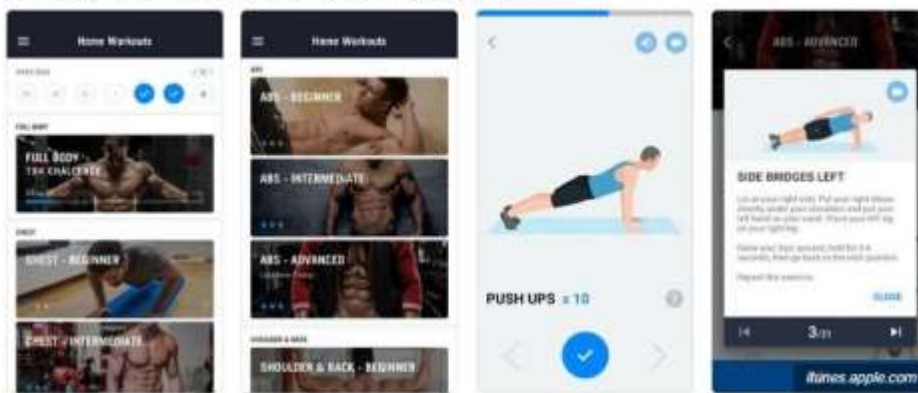


Figure 2. Home Workout – No Equipment Application

2. 30 Day Fitness Challenge – Workout at Home

30 Day Fitness Challenge – Workout at Home was designed by professional fitness trainers to challenge its users to complete all exercises within 30 days. Users can exercise at a level tailored to their abilities, from beginner to professional.

2. 30 Day Fitness Challenge - Workout at Home



Figure 3. 30 Day Fitness Challenge – Workout at Home Application

3. Freeletics: Personal Trainer & Fitness Workouts

Freeletics: Personal Trainer & Fitness Workouts has 900 variations of exercises that do not require equipment.

3. Freeletics: Personal Trainer & Fitness Workouts

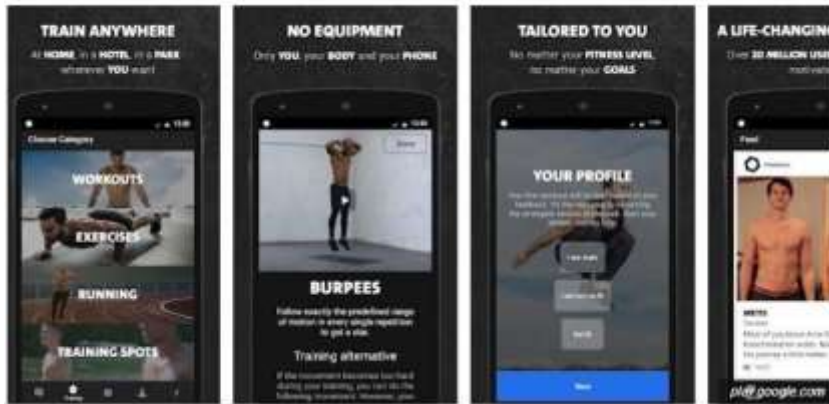


Figure 4. Freeletics: Personal Trainer & Fitness Workouts Application

4. Lose Weight in 30 Days

Lose Weight in 30 Days focuses the users of the application to balance dietary intake and exercises without any equipment.

4. Lose Weight in 30 Days



Figure 5. Lose Weight in 30 Days Application

5. BetterMe: Weight Loss Workouts

BetterMe: Weight Loss Workouts is specialized for women and guides its users to exercise certain parts of the body that are perceived to be their problem areas. This application also provides a good diet guide that is adjusted to the needs of the user.

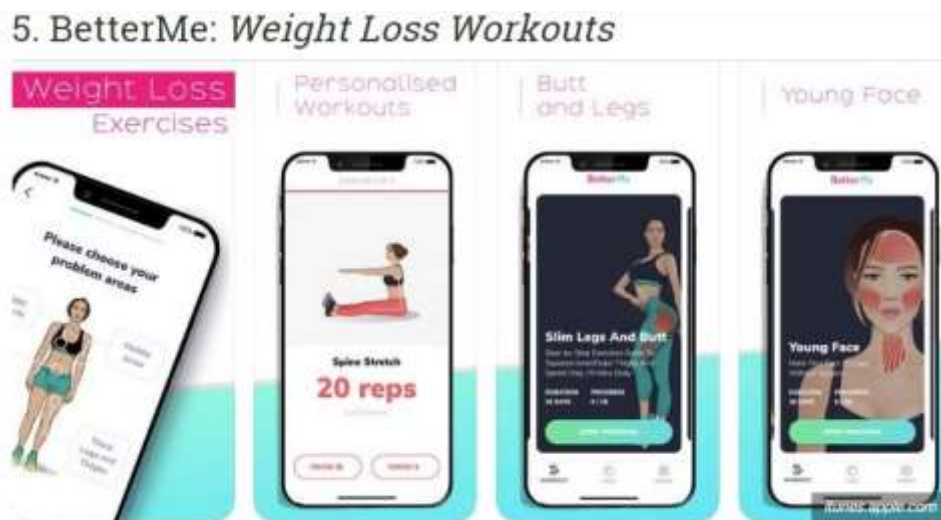


Figure 6. BetterMe: Weight Loss Workouts Application

6. Sworkit: Workouts & Fitness Plans

Sworkit: Workouts & Fitness Plans provides strength, cardio, yoga, and stretching exercises that can be performed according to needs.

6. Sworkit: *Workouts & Fitness Plans*

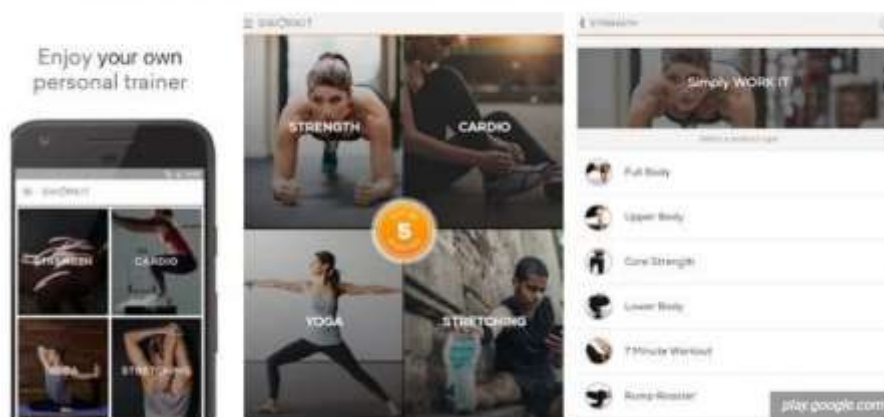


Figure 7. Sworkit: Workouts & Fitness Plans Application

7. Keep – Home Workout Trainer

Keep – Home Workout Trainer provides freedom to its users to select and control the types of exercise they perform, and allows users to see a report of the development of their training. There are more than 400 kinds of exercises that can be performed without having to go to a fitness center.

7. Keep - Home Workout Trainer



Figure 8. Keep – Home Workout Trainer Application

8. Workout Trainer: Fitness Coach

Workout Trainer: Fitness Coach provides various kinds of exercises at home and techniques of exercises using equipment at fitness centers. Certified trainers are available to guide users through photos, audio clips, and videos.

8. Workout Trainer: fitness coach



Figure 9. Workout Trainer: Fitness Coach Application

Designing the Android-Based Mosesahi Application

Designing an application must be done based on a flowchart and a storyboard.

1. Design flowchart of the Mosesahi application

Adi Ari Putro, Adang Suherman, and Kuston Sul-toni (2018) stated that the design for developing an Android-based application is based on a flowchart. Below is the design flowchart for the *Mosesahi* application.

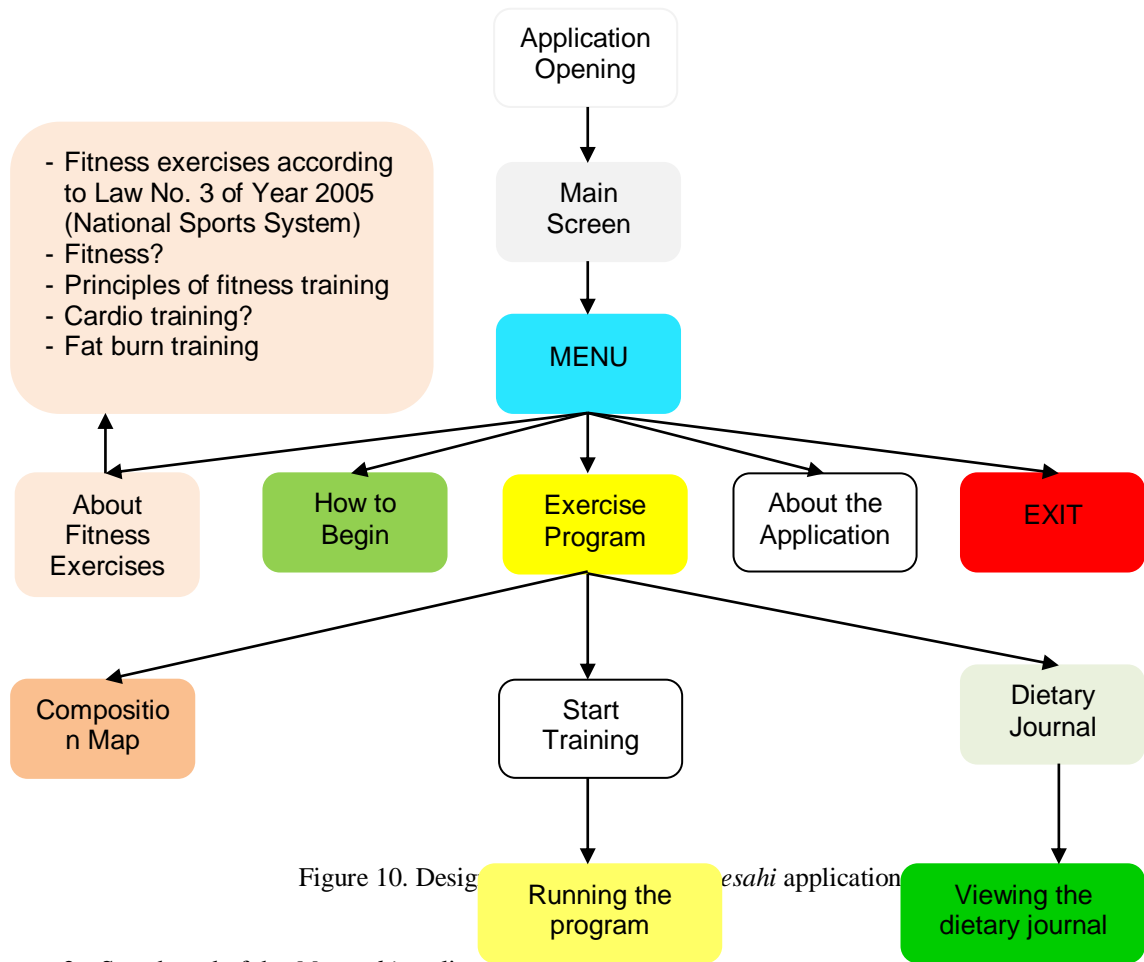


Figure 10. Design of the *Mosesahi* application

2. Storyboard of the *Mosesahi* application

A storyboard is composed of the application design in a layer-by-layer sequence accompanied with explanations and specifications of each image, layer, and text. The storyboard will explain the pathway of the application to be created. The following is the storyboard for the *Mosesahi* application.

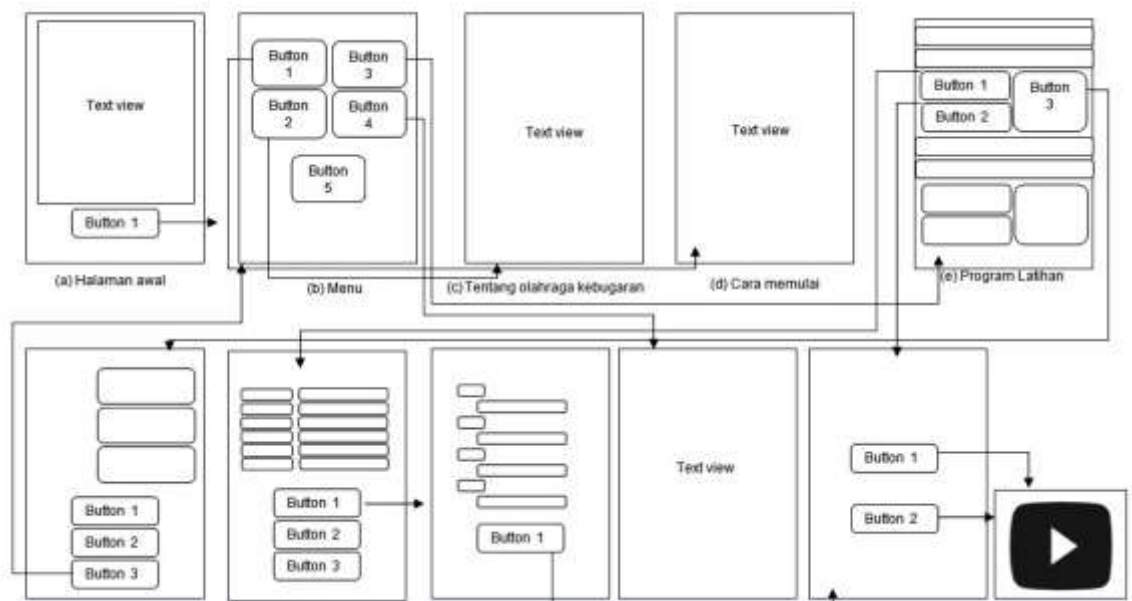


Figure 11. Storyboard design of the *Mosesahi* application

3. Design development of the Mosesahi application

The *Mosesahi* application will be titled “MOSESAHI version 1.0”. The difference between the *Mosesahi* application and earlier applications lies in the composition map and dietary journal. The body composition map will function as a calculator that can calculate the Basal Metabolic Rate, Body Mass Index, Waist-Hip Ratio, and Maximum Heart Rate based on data of age, body height, body weight, waist size, and hip circumference. The dietary journal is beneficial for users to view a record of the eating history from the past week. Both the composition map and dietary journal will aid users to evaluate the development of habits after undergoing a training program. The following is the prototype of the *Mosesahi* application.



Figure 12. Prototype of the MOSESAHI application design

The *Mosesahi* application may be developed through a research and development project in order to obtain expert’s validation and to test the validity, reliability, and the effectiveness of this product for users.

IV. Conclusion

The project of designing and building the *Mosesahi* application was conducted based on studies on existing fitness exercise applications that have been used to improve health and fitness.

The *Mosesahi* application will be titled “MOSESAHI version 1.0”. The prototype of the *Mosesahi* application will then be able to be developed through research and development project to conduct experts validation and to test the validity, reliability, and the effectiveness of this product for users.

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