

# The 2nd Conference on Management, Business, Innovation, Education, and Social Science (CoMBInES)

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## PHYSICAL WORKOUT APPLICATION FOR BASKETBALL PLAYERS

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### ABSTRACT

Physical fitness is one of the important factors for a basketball player. Because basketball is a sport that has a lot of physical contact with other players. Therefore, basketball athletes are required to have a good level of physical fitness. In this study, we will research the physical workout application for basketball players where this application is made using the Software Development Life Cycle (SDLC) Waterfall method and backtracking algorithm. This research method consists of 5 stages, such as requirements analysis stage where we collect materials that need to be used, designing stage where the project will be designed, Implementation stage where the project will be developed, testing stage where the project will be tested, and deployment stage where the project will be distributed. Due to this pandemic condition, several countries have limited their activities outside the house because of that many people do most of their activities inside their house. This results in them not being able to go to the gym or other places to work out. So, with this research, they can do workout without having to leave the house.

**Keywords:** *Physical fitness, Workout, basketball, application*

### INTRODUCTION

At the present stage, the system of training for basketball players should take into considerations the actions that an athlete performs in the competitions. Modern basketball requires high functional training and mastering all the techniques of the game (Koryahin et al., 2019). Training in sports involves developing skills as well as physical conditioning. Basketball requires skills, physical strength, and conditioning (Campbell., 2020). Basketball is a sports discipline that requires different physical features and physiological capacities. Players complete 4500–5000 m of distance in a game with versatile movements such as jumping, running,

and dribbling. The lower limb strength has a positive effect on the vertical jump height. Motor skills are at the forefront of basketball. However, basketball is a one-on-one contact sport, involving skills that require muscle strength. Although the physical attributes in basketball will be different according on which position the players are playing. But, during basketball game speed, changing direction, and vertical jump is a movement performed by all players regardless of positions (Cengizel, 2020).

The rapid development of achievements in basketball world requires trainer continuous search for new and more efficient means of technical and physical training of basketball players. The analysis of workouts and the results of the performances show that success can only be achieved as a result of many years of workouts and training.

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It has been found out precisely in teenager that the formation of the foundation for further development and physical takes place. (Koryahin et al., 2019). It is acknowledged that the legitimate technical methods that teenager acquired during the development process will be the base for future sports life. It is very useful for young players to know what their weaknesses and strength are in their early stages (Cengizel, 2020).

In recent years, we have seen a constant growth in mobile device development. During the last three years, the number of mobile apps for health monitoring has hit more than 100.000 available in the virtual stores. Recent study reported that 58% of all smartphone users downloaded a health related apps (Gabbadini & Greitemeyer, 2019).

SDLC (System Development Life Cycle) is one of the methods that creates software with the lowest cost in the shortest time possible. It has six phases such as requirement analysis, planning, designing, development, testing, and deployment. One of the most straightforward models from this method is waterfall model. Each phase has its own function and each phase waterfalls into the next phases (Apriani, 2019). We'll be using backtracking algorithm for this project.

A recent study by (Kagkani, 2017) shows that almost 58% of smartphone users downloaded fitness app at least once, but the retention of it is really low. Most of them feels too lazy to workout consistently. And in addition, now we are facing this pandemic situation, where most countries are restricting the activities outside the house to slow down the spread of the virus. most of the people stop going to gym to workout. They prefer to do most of their activities inside the house. So, to fix this issue we decide to create a workout

application that can motivate people to start working out and we can do all the workouts at home without having to go to gym.

## **LITERATURE REVIEW**

Research Entitled “Physical workout application for basketball players” is based on previous research, as follows:

Research by (Kagkani, 2017) explained that health is our main concerns, but there is a lot of people that rarely exercised. So why don't we use smartphones to improve our health condition? Most of the people who committed in physical activities is because they want to be healthy and stay in their best shape. Although almost 58% of smartphone users downloaded fitness app at least once, but the retention of this kind of apps is low compared to other types of apps. So, they decided to create a fitness app that will use some persuasive principles, such as goals or daily plan, simple and user-friendly design, free to user, and self-monitoring. They hoped that through this app they can motivate more people to exercise and keep their body healthy.

Next research by (Ismail, 2020) explained that we can get a lot of advantages from using mobile application. as for our project that are focusing on education, there are several benefits that we can get. It can help students access the information of their subjects anytime and anywhere, they can check their exam schedule and results, and keep in touch with their teacher if they have a problem with their subjects. Mobile application also inspires students to study and learning. Based on the study, using mobile application can helps student to study more efficient than using traditional ways such as using textbooks and whiteboard teaching. For this reason, they will be developing a Student Performance Tracking apps to keep tracks of their student

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performance. They will be using SDLC method in developing this apps. The process consists of 5 phases starting with requirements, design, development, testing, and maintenance.

Research by (Kurnia & Setiawan, 2019) explained that based on the results of their interview at Bandung field with people who were exercising, when they were asked about what is the difficulties they will get if they want to start a healthy life 70% of them answered feeling lazy because they have to search about how to live a healthy life manually and it takes longer time to get the information about healthy life. most of them adopt healthy lifestyle without any directions. Based on the answer given by the people they interviewed, they will create an app that will keep tracks of their calories and will teach them how to burn the calories. The development method used in this app is the waterfall model. It starts with requirements definition, system and software design, implementation and unit testing, integration and system testing, and the last phase is operation and maintenance.

Research by (Megalingam et al., 2019) explained that shopping is a pretty difficult and tiring things to do for some people because they have to find where they can buy the products they want and it is a time-consuming task. so, they want to solve the problem by building an android app for smart shopping using android studio. It is an open-source software that provides numerous tools for app development. The apps consist two parts mainly focused on Athe navigation to the location of the items and automatic billing for the products the user has bought.

Next the research by (Gupta et al., 2018) explained that Android Studio is one of the platform that we can use to build an android application, which is used in this research. In

this research, they are developing a laundry services app that will work in all places. This app is very helpful to all the workers, college students, or those people who don't have time to wash their clothes. The goals of this app are to provide employment and helps people who don't have time to wash their clothes. In this app the customer can select what kind of services they want, date of services, and the time of their services.

Last the research by (de Sá-Caputo et al., 2020) explained that due to the pandemic situation that we are having. A lot of countries are restricting people to do activities outside the house. This may cause the levels of their physical activities to decrease. So, they are trying to create a simple test or exercise where they can do it inside the house. This test is created to test the physical performance of the individual while they can exercise at the same time. In conclusion, this test will decrease their sedentary behaviors and improving their quality of life.

## RESEARCH METHODOLOGY

To develop this project, the author will be using *Software Development Life Cycle (SDLC) Waterfall* method. The implementation of this method is divided into few phases listed below



Figure 1 research flow

1. Requirement Analysis

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On this phase, we need to summarize all the required components to create the final products. This phase involves understanding what needs to design, function, purpose, etc. all the requirements and specifications needed will be studied and marked such as what kind of workouts that can be used in the project. At this stage, we will research about the body fat calculation formula and few workouts that will help basketball players reach their peak condition, such as plank that will increase the core muscle, squat that will increase their vertical or jumping ability, and push up that will increase their arm muscle etc.

## 2. System Design

The next phase is we will design all the structure of the project and the UI design. Such as, designing structure of the database, designing the UI display, and the structure of the project itself. We will be designing the database based on ERD, designing the UI based on our storyboard, and for the structure, we will use Use Case Diagram. We will be designing some pages that includes step counter page, workout page, water intake page, and body fat calculator page.

## 3. Implementation

With inputs from the System Design phase, the system will be developed in small programs called units. Each unit will be combined into one single system. We will develop all the function of the project in this phase using Java programming language. In this stage, we will create the function of the pages that was designed on the last stage. We'll insert workout that will help developing important muscles for basketball player, insert the body fat calculation formula, and tracking our steps and water intake.

## 4. Testing

In this phase, we will do testing for all possible defects in the function on the programs using Black Box Testing with backtracking algorithm. This algorithm can determine the solution is valid or not in pretty short time. It will test all the possible outcome of the unit to see If there is any error on the program. This phase is to make sure the project is fully function and run smoothly before the project is launched. If there is any disfunction writer will fix it.

## 5. Deployment

In this phase, the project will be launch in the market. This is the last phase of the waterfall method where all the users can receive the benefits of the project

## RESULTS AND DISCUSSION

### 4.1 Requirement Analysis

On this phase, we will be doing research to summarize all the required components that will used to create the app. First, we research about which workout that will improve the physical condition of a basketball players, we found a few workouts that is very suitable for them. such as push up (this workout will develop the upper body strength which is very important for basketball players), plank (this workout will increase the core strength which will greatly improve the body control of the player), squat (this workout will increase the lower body strength that will boost players athletic ability such as jumping). These workouts are few of the workouts that we will use in the application. next we research about how to make a step counter and the formula to calculate your body fat. Last, we make a

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schedule of all the process to create this app that will be listed below:

Activities	Oct-21			Nov-21			Dec-21		
	1	2	3	1	2	3	1	2	3
Requirement Analysis	█	█							
System Design			█	█	█				
Implementation						█	█	█	
Testing								█	
Deployment									█

Table 1. Schedule

## 4.2 System Design

On this phase, we design the structure and the UI design of the app. We will be designing some pages that includes step counter page, workout page, water intake page, and body fat calculator page.

### 4.2.1 Step Counter page

On this page, it will display the total number of steps that we have taken, and we can see the total step we have taken for the past few days.



Fig. 4.2.1 Step counter page

### 4.2.2 Workout Page

On this page, it will display the total percentage of the workout you have done, and it includes all the workouts from day 1 to day 30 and rest day (cheat day). And on the next page of the workouts, it will display an instruction on how to do the exercise and it will display the total of workout you have done and the duration.



Fig. 4.2.2 Workout page

### 4.2.3 Water intake Page

On this page, it will keep track of the total of water we have drink and a reminder to take our water. It includes the total steps that we take and the progress of our workout.



Fig. 4.2.3 Water Intake Page

### 4.2.4 Body Fat Calculator Page

On this page, it can calculate the fat percentage of your body and what is your ideal fat percentage.



Fig. 4.2.4 Body Fat Calculator Page

## 4.3 Implementation

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With inputs from the System Design phase, the system will be developed in small programs called units. Each unit will be combined into one single system. We will develop all the function of the project in this phase using Java programming language. In this stage, we will create the function of the pages that was designed on the last stage. We'll insert workout that will help developing important muscles for basketball player, insert the body fat calculation formula, and tracking our steps and water intake.

#### 4.4 Testing

In this phase, we will do testing for all possible defects in the function on the programs using Black Box Testing with backtracking algorithm. This algorithm can determine the solution is valid or not in pretty short time. It will test all the possible outcome of the unit to see If there is any error on the program. This phase is to make sure the project is fully function and run smoothly before the project is launched. If there is any disfunction writer will fix it.

#### 4.5 Deployment

In this phase, the project will be launch in the market. This is the last phase of the waterfall method where all the users can receive the benefits of the project.

#### LIMITATION

Based on the results of this research, author also has many limitations. This application is built on android platform and can only use it on android. We hope that the next research can develop this app so it can run on another platform such as IOS.

#### CONCLUSION

Physical workouts are one of the ways for basketball players to develop their muscle and maintain their body on their best condition

so they can always compete on the highest level. Develop and designing this application using SDLC Waterfall method, this method really helps reducing the time to create this app. Because of its well-structured process it really helps us to have a very structured approach to create this app. The Software Development Kit that is provided by Android Studio helps increasing the user experience in using the application. The result of this research is a workout application that can help basketball players to maintain their body on the best condition.

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