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Development of Smartphone-Based Athlete Physical Fitness Applications During Work From Home

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Abstract

Developing exercise equipment is one way to modify the fitness training concept. This research focused on developing a smartphone-based physical fitness exercise program for athletes working from home during the Covid-19 pandemic. The approach used was a descriptive procedural model, which identified the procedures that must be carried out to make a product. Quantitative and qualitative data were used in this study. The results showed that the approval rating of the practical category was 93% from material experts and 92% from media experts. The application has eight fitness movements, including warming up, sit up, plank, wall sits, push up, back up, lunges and squats. The application is available and can be downloaded on the Google Play Store for android users. It can produce effectiveness and influence the users by reminding them to exercise at home. This application is ready to be used by the community, with a small group trial result of 93.2% and a large group trial result of 86.1%. This application is a breakthrough for coaches to develop athletes' physiques during a pandemic to exercise at home.

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INTRODUCTION

The COVID-19 pandemic has caused many impacts. The infection by diseases can be reduced by sufficient or light exercise (Arimbi, 2022; Hart, 2022). Compared to activities such as sitting or doing nothing, light physical activity is more beneficial for immune function (Giriwijoyo et al., 2020; Pudkasam & Apostolopoulos, 2022; Salimans et al., 2022). The impact that the Indonesian people also feel is the limited space for movement during the pandemic. Activities routinely carried out outside the home are carried out at home or known as Work From Home (WFH) issued by the government. On the other hand, regular exercise activities can have the opposite effect since they can cause a transient decrease in many areas of immune function (neutrophils in the respiratory system, proliferation of lymphocytes, presentation of monocyte antigens). Within three to fourteen hours of exercise, some immunological processes usually begin to deteriorate, depending on the time and intensity of the exercise. When exercise is carried out continuously for a long time (more than 1.5 hours), moderate to high-intensity exercise (55%-75% of maximum O_2 consumption), or without food intake first, immune dysfunction occurs (Gleeson, 2007; Majid, 2020; Saputra & Hariadi, 2018; Widiyanto, 2020). The disruption of activities and even the impact experienced by the world of sports is the multi-world event, namely the Olympics, which was planned to be held in Tokyo in 2020. The event had to be postponed due to the spread of the COVID-19 virus (Gunawan, 2020; Kardiyanto, 2020; Samsudin, 2020).

The solution needed is to provide light exercise activities in the form of physical fitness training programs, such as complete gymnastic exercises, which are a series of motor movements using only one's weight to form body muscles (Silvester, 1992). Activities without using these tools include pulling, pushing, and lifting. The more muscle mass you have, the more often it works. This activity can be done using a smartphone that provides applications for push-ups, sit-ups, lunges, squats, planks, and wall sits (Burke, 2019; Gardner, 2017). According to (Burke, 2019; Nuraulia,

2019; Sudiana, 2014), physical fitness is described as a person's ability to carry out daily tasks with ease, without becoming too tired, and with sufficient energy or reserves to enjoy spare time and fulfill needs. However, many people and athletes don't train.

Several researchers have carried out several pieces of research on developing training tools through android applications (Chistiyah & Priyanto, 2021; Fathul & Rejeki, 2021; Marwan, 2018; Suhairi & Arifin, 2022). Some of these studies explain that the android application provides convenience and helps athletes exercise because it can be accessed anywhere by presenting various forms of exercise. However, researchers have never developed exercise applications for athletes' physical fitness. Development research through android on physical fitness has been carried out not in the form of exercise but the form of tests (Ardilla et al., 2021; Marpaung & Amzah, 2022; Maulidin, Zul Anwar, 2020). For this reason, based on the problem faced in the world of sports, many athletes find it difficult to train with coaches during the COVID-19 pandemic. The researchers wanted to provide solutions to maintain body fitness. For athletes, it is necessary to hold regular physical fitness exercises because, during the pandemic, many regional coaches and local clubs have not run many training programs for their athletes during the COVID-19 pandemic. After all, athletes are off duty. Here, the researchers wanted to provide alternative application-based media products to maintain athlete fitness when working from home during the COVID-19 pandemic. When the pandemic is no longer available, this product can be accessed by anyone on the Play Store platform and can be used as an alternative. In this case, the researchers developed a smartphone-based application of physical fitness exercise programs for athletes during work from home or during the COVID-19 pandemic.

METHOD

The researchers employed the research and development (RnD) method (Borg & Gall, 2007). In this research, the test subjects were sports players, students, and athletes in semesters 4 and 6 who had mastered basic coaching science courses at the Department of Sports Education, Riau University. The subjects were involved in small group trials (6 – 12 subjects) and large-group trials (30 – 100 subjects). The techniques used in collecting data were observation and questionnaires, which consisted of the results of the feasibility test of material experts and media experts. The assessment was carried out by material experts, media experts, and athletes/students. The instrument grid for material experts is presented in table 1.

Table 1. Instrument Grid for Material Experts

Indicators	Number of Items
Material Clarity	1
Language	1
Language Clarity	1
Clarification Material Pictures	1
Material Sufficiency	1
Material Update	1
Clarity of Guide Instructions	1
The accuracy of the selection of materials used for the guide	1
Example clarity	1
Content truth	1
Total	10

The expert media grid is presented in table 2 below:

Table 2. Assessment of Display Aspects by Media Experts

Assessed Media Aspects	Number of Items
The correctness of the choice of background color	1
Image shape accuracy	1
Button placement	1
Font selection accuracy	1
Navigation structure clarity	1
Text efficiency	1
Tidy slides	1
Image and text quality	1
Matching colors and text with the background	1
Total	9

The data obtained through trial activities were classified into two, namely quantitative data and qualitative data. The quantitative data were numerical results collected through questionnaires. At the same time, the qualitative data were suggestions put forward by media experts to improve the implementation of this training program. Field observation, drafting, initial product development, small group testing, product modification, field testing, revision, and assessment were the seven phases of the Borg & Gall process. The data analysis technique used was descriptive and quantitative-qualitative data. This research used observations and questionnaires that material and media experts assessed. The data analysis techniques were descriptive and quantitative-qualitative data. The data were converted into quantitative data on a scale of 4, namely scores of 1 to 4. The data analysis technique is presented in table 3.

Table 3. Data Analysis Techniques

No.	Scores	Categories
1.	<40%	Not feasible
2.	40%-55%	Less feasible
3.	56%-75%	Quite feasible
4.	76%-100%	Feasible

Mathematically, it can be expressed by the equation, According to (Sugiyono, 2010) using percentage level value:

$$\frac{\sum \text{the scores obtained from the researcher}}{\sum \text{the ideal score of the entire item}} \times 100\% =$$

The following is a flowchart and steps in this research and development, or RnD is at the forefront of qualitative and quantitative approaches.

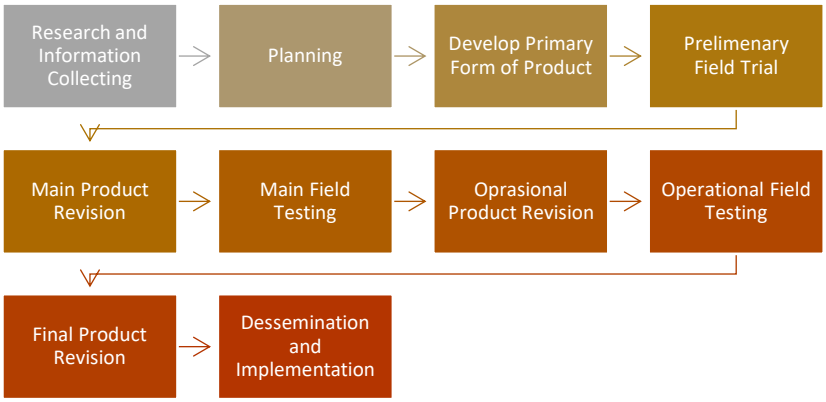

Figure 1. The Procedure of Research and Development by Borg & Gall

RESULTS AND DISCUSSION

Result

Rumah Fitar is the name of the developed application for a physical fitness training program During the COVID-19 pandemic to remind athletes to carry out physical fitness routines at home. The physical activities maximize body weight utilization by looking for theory and the practice of gymnastics as references. The application provides comments to several respondents. The following is a product description of the application.

The first application start page is the offering page. The page contains the name of the application maker and supervisor. Users can select the continue or exit button at the bottom. The offering page is presented in Figure 2.

Figure 2. App Offerings Page

On the log-in page, users are asked to log in using a google account that already exists on an Android smartphone. The Application Contents page is presented in Figure 3.

Figure 3. Application Contents Page

On the home page, there are four menus, including the Initial Training menu, Training Scheduling, What menu, and About menu.

Figure 4. App Home Page

The exercise menu contains demonstration videos and explanations demonstrating several physical fitness exercises, including warm-ups, push-ups, sit-ups, wall sits, planks, lunges, back-ups, and squats. After seeing the movement and imitating it, users can share the results of the exercise with other users or on social media.

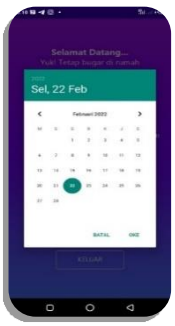

Figure 5. Schedule a Workout page

The Schedule Workout menu contains the date and time to schedule a workout and can pop up a notification to remind you of the workout. What and About menu explains calcenic exercises and body weight training.

Figure 6. Application Description Page

The material expert was Muhammad Saputra, the physical trainer of KS Tiga Naga since 2016. He holds a LANKOR basic physical license and a level 1 athletic license from the Association of International Athletics Federations.

Table 4. Material Assessment Data

No.	Assessed aspects	Score obtained	Maximum score	Percentage	Category
1.	Design	47	50	94%	Feasible
2.	Content	23	25	92%	Feasible
3.	Technical	33	35	94%	Feasible
Total Score		103	110	93%	Feasible

The media expert was Dr. H. Muhammad Nasir, S.SI., M.Kom. He is a professor and a lecturer of Physics Education at the University of Riau. He is an expert in computer operating systems, web programming, and application development. The Media Expert Assessment Data is presented in table 5.

Table 5. Media Expert Assessment Data

No.	Assessed aspects	Score obtained	Maximum score	Percentage %	Category
1.	Design	48	50	96%	Feasible
2.	Pedagogic	43	50	86%	Feasible
3.	Content	22	25	88%	Feasible
4.	Technical	35	35	100%	Feasible
Total Score		148	160	92%	Feasible

Media and material experts revised the Android-based fitness program application once. This Android app was revised and ready to enter the pilot phase with coaches, players, and students. Product revisions based on the material expert's suggestions covered the real motion videos and the addition of warm-up motion videos and the word gymnastics or bodyweight training. The product revision is presented in table 6.

Table 6. Product Revisions

Before Revision	After Revision
	
	

Before opening the application, the media expert suggested adding an offering page and a log-in page. The media expert's revision is presented in table 7.

Table 7. Media Expert Revisions

Before Revision	After Revision
Without the offering and log-in pages.	 

A small group trial was conducted after expert evaluations, and certain adjustments were made. As a result, the researchers conducted a small group trial with only eight participants.

Table 8. The Results of the Small Group Trial

No.	Assessed aspects	Score obtained	Maximum score	Percentage %	Category
1.	Product Display	116	120	96.6%	Feasible
2.	Product Innovation	113	120	94.1%	Feasible
3.	Product Functions	144	160	90 %	Feasible
Total Score		373	400	93.2%	Feasible

The results of the small group trial showed that the product display aspect score was 96.6%, which was in the feasible category. The product innovation aspect got 94.1%, which was in the feasible category. Lastly, the product function aspect got a value of 90%, which was in the feasible category. The total value of this small group trial was 93.2%, which was included in the feasible category. The results indicated that the product could proceed to the next level of testing.

Suggestions and improvements were done based on the small group trial by changing the layout of the main menu to make it more minimalistic, as described in table 9.

Table 9. Media Expert Revisions

Before Revision	After Revision
	

A large group trial was conducted on 30 people in one day, including coaches, athletes, and sports students. The procedure was the same as the small group trial. The following table is the result of the large group trial:

Table 10. The Results of the Large Group Trials

No.	Assessed aspects	Scores obtained	Maximum score	Percentage %	Category
1.	Product Display	392	450	87.1%	Feasible
2.	Product Innovation	387	450	86%	Feasible
3.	Product Functions	513	600	86.5%	Feasible
Total Score		1.292	1.500	86.1%	Feasible

The results of the large group trial show that the score for the product display aspect was 87.1% in the feasible category, and the score for the product innovation aspect was 86% in the feasible category. The score for the product function aspect was 86.5% in the feasible category. The total score of the large group trial was 86.1%% in the feasible category. It means that this application product can be mass-produced.

Discussion

During the Covid-19 Pandemic, the researchers developed an application for a physical fitness exercise program for athletes who work from home. With the current state of electronic media, this product was created as a training medium and reminder that makes it easier for users to carry out physical fitness activities. It can be easily used and downloaded from the Google Play Store. Data collection, product design, product validation, product revision, small group trial, large group trial, and mass production are some of the stages of this research.

The finished product was validated by material and media experts. The validation from the material expert resulted in a practicality score of 93%, with recommendations for more practice. After being validated by a material expert, the application was checked by a media expert, who gave a score of 92%, which indicates that the application was useful. They also provided several recommendations, such as adding a presentation and log-in pages.

The trials of this application were divided into two stages: small group and large group trials. The app received a 92% rating in the feasible category in the small group trial of eight respondents. In the large group trial with 30 respondents, the application received an evaluation score of 86.1% in the feasible category. This application is ready to be published after receiving revisions from media experts, material experts, and respondents. There are four main menus on one main page, including the initial training menu, which contains exercise videos that can be viewed and imitated at home and a sharing feature that can be shared via social media. The exercise schedule menu creates exercise schedules to remind application users to do physical fitness exercises. What menu contains calisthenic exercise or bodyweight training. The about menu contains the owner of the application.

This research has the feasibility of developing athletes' physical fitness. This research is supported by previous studies and appropriate reference books for developing android-based applications (Ardilla et al., 2021; Chen, 2017; Jansson et al., 2019; Silvester, 1992; Vancini et al., 2021). However, the development of this physical fitness exercise application media also has several limitations, including (1) the sample of this study was too small in scope, namely the average student of Riau University Sports Development Education. Further research may be needed to reach a wider range of respondents. (2) This application cannot be used on iPhone or iOS. (3) The number of video movements in the application is only eight, and more physical fitness movements can be added and grouped.

CONCLUSION

The developed product is suitable for a reminder of physical fitness training schedules. It can be used not only by sports players but also by the general public. This physical fitness training application named Rumah Fitar can be further developed by making it accessible via iPhone or IOS so that more users will be available. For its features, users can add a live broadcast or record feature

during training so that the coach can directly monitor athletes during training or exercises together with other people at home.

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