

## Act.Fit Application of Adult Physical Fitness Measurement in Indonesia Actuar. Aplicación Fit De La Medición De La Aptitud Física Del Adulto En Indonesia

\*Sigit Dwi Andrianto, \*Erwin Setyo Kriswanto, \*Indah Prasetyawati Tri Purnama Sari,  
\*Soni Nopembri, \*Subagyo, \*Muhamad Ichsan Sabillah, \*\*José Vicente García-Jiménez  
\*Yogyakarta State University (Indonesia), \*\*Universidad de Murcia (España)

**Abstract.** This research is part of development research using the Borg and Gall method and the development method. The expected goal of this research is to develop an Android-based "Act.Fit" application that allows adults to measure physical fitness independently, test the validity and reliability of physical fitness measurement instruments through an Android-based application "Act.Fit". The steps for developing an Android-based application "Act.Fit". This study involved 40 adults as research subjects. Data collection was carried out through an online questionnaire as a physical fitness instrument based on the "Act.Fit" application. The results of the assessment of material experts, media experts, and fitness practitioners on the "Act.Fit" Android-based application are: 1) Material experts give an average score of 4.47 in the "very good" category, 2) Media experts give an average score of 4.42 in the "very good" category, 3) fitness practitioners gave an average score of 4.81 in the "very good" category. The validity test produces a score of 0.939 which indicates validity. The reliability test produces a score of 0.950, proving that the product is reliable, 5) Small group users give an average score of 3.65 in the "good" category, and 6) The large group gives an average score of 4.47 with a score of "very good" Good". After going through a series of research stages above, the final product of the "Act.Fit" application is ready to be used by the wider community in the following research year.

**Keywords:** app, android, physical fitness, act.fit

**Resumen.** Esta investigación es parte de la investigación de desarrollo utilizando el método de Borg y Gall y el método de desarrollo. El objetivo esperado de esta investigación es desarrollar una aplicación "Act.Fit" basada en Android que permita a los adultos medir la condición física de forma independiente, probar la validez y confiabilidad de los instrumentos de medición de la condición física a través de una aplicación "Act.Fit" basada en Android. Los pasos para desarrollar una aplicación basada en Android "Act.Fit". Este estudio involucró a 40 adultos como sujetos de investigación. La recolección de datos se realizó a través de un cuestionario en línea como instrumento de aptitud física basado en la aplicación "Act.Fit". Los resultados de la evaluación de expertos en materiales, expertos en medios y practicantes de fitness en la aplicación basada en Android "Act.Fit" son: 1) Los expertos en materiales otorgan una puntuación promedio de 4.47 en la categoría "muy buena", 2) Expertos en medios dan una puntuación media de 4,42 en la categoría "muy buena", 3) los practicantes de fitness dieron una puntuación media de 4,81 en la categoría "muy buena". La prueba de validez produce una puntuación de 0,939 que indica validez. La prueba de fiabilidad arroja una puntuación de 0,950, lo que demuestra que el producto es fiable, 5) Los usuarios del grupo pequeño dan una puntuación media de 3,65 en la categoría "bueno", y 6) El grupo grande da una puntuación media de 4,47 con una puntuación de "muy bien" Bien". Después de pasar por una serie de etapas de investigación anteriores, el producto final de la aplicación "Act.Fit" está listo para ser utilizado por la comunidad en general en el siguiente año de investigación.

**Palabras clave:** app, android, aptitud física, act.fit

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Sigit Dwi Andrianto  
sigitdwiandrianto@uny.ac.id

### Introduction

The COVID-19 pandemic some time ago has adversely inflected many aspects, particularly related to human activities. The novel virus brought about Severe Acute Respiratory Syndrome (SARS), hence acquiring its name, SARS-CoV-2 (Bulut & Kato, 2020). The COVID-19 virus was first identified in Indonesia in March 2020 (Yuliana, 2020), limiting society to conducting physical activities because of subsequent restrictions imposed. The restriction influences society's health levels and quality of life. Restrictions bring about interfered with social mobility and decline in health levels. A mounting number of fitness centers and manufacturing facilities closed is disproportional to the demand for an active lifestyle which obliges individuals to perform high physical activities to maintain health and immunity.

Dietary patterns and nutritional intake impact body mass appearance measured using the Body Mass Index (BMI) (Delfa-De la Morena et al., 2022; Li et al., 2019).

Dietary patterns play an essential role in health (Wollaston et al., 2015) as failures at regulating dietary patterns can engender obesity, and obesity survivors are apt to do inadequate physical activities. Resonating with Martínez-López et al., (2018) the risks of being overweight and obese are correlated with the inclination to execute physical activities insufficiently. Physical activities are considered important determinants of fitness (McKinney et al., 2016). The more physical activities and sports exercises one performs, the better the physical fitness level (Figueiredo et al., 2020; Sepriadi, 2017).

It is widely believed that physical activities do good in escalating human health and quality of life (Polero et al., 2021). Regular physical activities also enable the body to respond to vaccines better (Alarcón Meza & Hall-López, 2021; Mobasheri, 2020). The benefits of physical activities for health can be optimized if undertaken in different intensities (Füzéki et al., 2020). Low physical activities can inflect the physical fitness degrees of individuals because physical fitness is defined as a set of attributes achieved

based on the body's capacity to carry them out (García et al., 2019). A high physical fitness degree increases life expectancy rates (Suyati et al., 2022) and decreases risks of non-communicable hypokinetic diseases (Arena et al., 2016).

Since being influenced by genetic factors (Benda et al., 2015), physical fitness is different between individuals, considering that each individual must have distinctiveness and discrepancy related to life experiences (Fahey et al., 2015). Additionally, physical fitness, covering strength, speed, and endurance, is also derived from parents (Bompa & Buzzichelli, 2015). Fitness cannot exist suddenly (Chen et al., 2018). In addition, physiological factors, encompassing the heart's ability to pump blood, cells' capacity to produce energy (Fahey et al., 2015; Permatasari et al., 2018), metabolism process (Kriswanto et al., 2020), and anti-aging (Miyamoto et al., 2017), also affect physical fitness. Physical fitness is also of great benefit in reducing the possibility of injury (Titis, 2015). Other factors impacting physical fitness are ethnicity and gender (McVeigh & Meiring, 2014).

Physical fitness covers two areas, i.e., health-related physical fitness and skill-related physical fitness (Birhanu & Gedefaw, 2019). Health and skill-related physical fitness constitute a preventive effort to face threats of several cardiovascular diseases (Sukanti et al., 2016). The determinant factors are two, namely, internal and external factors (Arifin, 2018). Physical fitness through physical activities is better to be executed with supervision from fitness practitioners to result in maximum outcomes and be able to be integrated with fitness training programs (De Marco et al., 2023). A training process has to pay attention to the duration, intensity, types of muscle contraction (Wylegala, 2016), number of training sessions, and recovery (Bompa & Buzzichelli, 2021). And yet, social restrictions have adversely inflected society, which finds difficulties in directly consulting with fitness practitioners typically provided at fitness centers.

BMI and physical fitness can be measured using a variety of instruments, yet general society (non-athletes) cannot appropriately self-measure their BMI and fitness degree without the help of fitness practitioners. An application (hereafter referred to as "app") should hence be developed to assist them in measuring their own BMI and fitness degrees independently. Our survey, which is related to society's need analysis for the development of an Android-based physical fitness guide, points out that 93 of the respondents prefer a fitness guide to a conventional book to do physical fitness exercises independently (Sari et al., 2022). BMI can be measured by inputting body height and weight into a determined formula, whereas the most efficient physical fitness measurement general society can perform independently is through the Rockport walking test. The two measurement methods can be built into an Android-based app software society that can run independently. We believe that developing a related app that can help general society measure BMI and fitness

independently becomes necessary, particularly because of social restrictions. We name the generated app Act. Fit, which stands for Activity for Fit.

## Material And Method

The research design was adopted from Borg and Gall's development research steps. We set the year-1 research focus on developing a product to measure BMI and physical fitness using steps 1 to 10. The research aimed to design an Android-based app to support a certain cardiovascular endurance fitness program named GO FIT. The research provided an evidence-based practical recommendation to develop prospective and future-oriented fitness measurement apps. Participants of this research 40 respondents were engaged in the initial data survey. The small group test involved ten adults, while the large one involved 30. Samples were not gender-based differentiated (either male or female) as the in-built app system could carry out an automatic analysis using algorithms. We focused on sample age selection, i.e., adult-considered or above 18 years old. The age was suitable for the conducted physical fitness measurement. The research area was Stadion Mandala Krida, Yogyakarta.

### a) Development Steps

The app development steps referred to Borg and Gall's development research procedures, composed of steps 1 to 10 as follows:

#### 1. Potency and Problem Analyses

Potency and problem analyses were executed commensurate with the problem and need to be elaborated in the background, namely the need for making an Android-based app to measure BMI and physical fitness levels general society could use independently.

#### 2. Literature Study and Information Collection

The subsequent step was performing a literature study to gather app-supporting materials. Some acquired materials were texts, images, and symbols from several kinds of literature, e.g., books, the Internet, and journals. A survey was also undertaken on general society at this stage. Ten question items concerning society's need for Android-based apps to measure BMI and physical fitness independently were proposed to 40 respondents. The results showed that 90% of respondents admitted the need for an app for performing physical fitness exercises (Sari et al., 2022).

#### 3. Initial Product Design

We made the initial product design at this stage. We made an app flowchart as the first step. The flowchart allowed us to determine how the app operated. It was supported by gathered materials. The flowchart and app materials were built using maker software using a computer programming language, engendering the initial product of

the Act. Fit app. The initial product was then validated by experts.

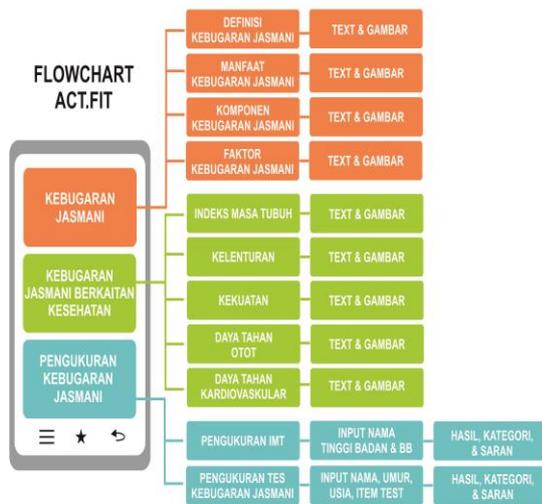


Figure 1. Act.Fit Flowchart

#### 4. Design Validation

The next step was product testing by three judgment experts using instruments we provided with a Likert scale. The three experts comprised a health and fitness material expert, a media and programming expert, and a physical health and fitness practitioner or personal trainer. The product was tested for its validity and reliability using app instruments with Product Moment and Cronbach's Alpha methods. Data on judgments were collected using questionnaires with a Likert scale.

#### 5. Design Revision

We revised the initial app design based on judgments and inputs from the three judgment experts. Considered-good aspects were maintained, but poor ones were revised by suggestions. We asked for the experts' confirmation after revising the app product until they declared the product agreement.

#### 6. Trial Product Making

A trial product was made after we completed the

revision process. This stage required us to finish the product before testing it on small-scale samples.

#### 7. Small Test

The product, which had been considered reliable by experts, was tested on general society, from which we took small-scale samples as sample users. We randomly selected ten participants using a random sampling technique. We instructed them to carry out self-measurement and judge the trial app product. Data on judgments from the small test were collected using questionnaire instruments with a Likert scale.

#### 8. Small Test-Generated Revision

Judgment results from the small test were followed up by revising the app product comporting with the suggestions given. Good aspects were maintained, but others that did not conform to users were revised.

#### 9. Large Test

After revising the app product grounded on users' suggestions from the small test, we conducted another test on larger samples. 30 participants as users were instructed to execute self-measurement and judge the revised trial app. Data on judgments from the large test were collected using questionnaire instruments with a Likert scale.

#### 10. Large Test-Generated Revision

The results of the judgments from 30 user subjects through a large test were used to revise the app. The revision was undertaken continuously for product refinement. The final app product was used for another measurement with a larger scale in year-2 research. All statistical data were processed using SPSS.

### Results

#### 1. Initial Survey Data

Data collected from this initial survey disclosed general society's need for Android-based apps to measure BMI and physical fitness independently. Data were collected from 40 adults as subjects, as demonstrated in detail in Table 1:

Table 1. Initial Survey Data

No.	Question Item	Subject Response	
		Yes	No
1	Once hearing about physical health and fitness measurement tests	38	2
2	Knowing physical health and fitness measurement tests	38	2
3	Familiar with physical health and fitness measurement tests	2	38
4	Familiar with reference sources for physical health and fitness measurement	38	2
5	Performing physical health and fitness measurement tests	12	28
6	Being a smartphone user	40	0
7	Accessing a smartphone more frequently than a book	38	2
8	Requiring an app that supports independent BMI and physical fitness measurement	36	4
9	Preferring to undertake app-based measurement	36	4
10	Preferring app-based measurement guide to conventional books	38	2

#### 2. Expert Judgment Data

A data summary concerning judgments from the three experts (material expert, media expert, and practitioner) is

exhibited in Table 2.

Table 2. Data on Judgments from the Material Expert at Stages I and II

Stage I	
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No.	Judged Aspect	$\bar{x}$ Score	Category
1	Guide material quality	4.25	Very good
2	Content	4.1	Very good
Mean		4.175	Very good

Stage II			
No.	Judged Aspect	$\bar{x}$ Score	Category
1	Guide material quality	4.75	Very good
2	Content	4.8	Very good
Mean		4.775	Very good

Table 3.

Data on Judgments from the Media Expert at Stages I and II

Stage I			
No.	Judged Aspect	$\bar{x}$ Score	Category
1	Appearance	4.18	Very good
2	Programming	3.82	Good
Mean		4.0	Good

Stage II			
No.	Judged Aspect	$\bar{x}$ Score	Category
1	Appearance	4.68	Very good
2	Programming	4.16	Very good
Mean		4.42	Very good

Table 4.

Data on Judgments from the Practitioner Expert at Stages I and II

Stage I			
No.	Judged Aspect	$\bar{x}$ Score	Category
1	Guide material quality	4.4	Very good
2	Content	4.5	Very good
Mean		4.45	Very good

Stage II			
No.	Judged Aspect	$\bar{x}$ Score	Category
1	Guide material quality	4.8	Very good
2	Content	4.83	Very good
Mean		4.815	Very good

### 3. Validity and Reliability Data

Data on the validity and reliability of the Android-based measurement instrument “Act.Fit” are demonstrated in Table 5.

Table 5.

Validity and Reliability Data

No.	Aspect	Validity Score $\bar{x}$	Description	Reliability Score	Description
1	Appearance aspect	0.965	Valid	0.970	Reliable
2	Learning aspect	0.896	Valid	0.921	Reliable
3	Material aspect	0.962	Valid	0.967	Reliable
4	Usability aspect	0.927	Valid	0.944	Reliable
Mean		0.939	Valid	0.950	Reliable

### 4. Small Test-Generated Data

Data from the small test carried out on ten adult subjects as app users are exhibited in Table 6.

Table 6.

Data from the Small Test

No.	Judged Aspect	Score $\bar{x}$	Category
1	Appearance aspect	3.5	Good
2	Learning aspect	3.65	Good
3	Material aspect	3.625	Good
4	Usability aspect	3.825	Good
Mean		3.65	Good

### 5. Large Test-Generated Data

Data from the large test conducted on 30 adult subjects as app users are exhibited in Table 7.

Table 7.

Data from the Large Test

No.	Judged Aspect	Score $\bar{x}$	Category
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1	Appearance aspect	4.57	Very good
2	Learning aspect	4.36	Very good
3	Material aspect	4.48	Very good
4	Usability aspect	4.5	Very good
Rata-Rata Akhir		4.47	Very good

## Discussion

This research offered novelty to general society, allowing them to measure BMI and physical fitness degrees independently. The resulting app, which was Android-based, was easy to operate. Besides, we planned to also release the app in Playstore, making it freely downloadable and available for offline use. Society could therefore access it in any condition and was not contingent upon signal availability. This app also helped society to access public facilities which might still be under post-pandemic ongoing recovery. Furthermore, it also contributed to the bulk of society with an inability to spend money on consultations service with fitness practitioners. This research is in line with previous research Sarker et al., (2015) which stated that the development of application software products is very promising because it directly provides significant benefits to the general public in the form of distributable and affordable products. Another benefit society got from app-based products is their eco-friendliness as they were paperless, thereby advocating the Go-Green movement.

## Conclusion

This research engaged 40 adults as subjects and developed a guide and physical fitness activity measurement using an Android-based app “Act.Fit”. The online questionnaire instrument results revealed that: 1) The material expert gave a mean score of 4.47 with a “very good” category, 2) The media expert gave a mean score of 4.42 with a “very good” category, 3) The fitness practitioner gave a mean score of 4.81 with a “very good” category, 4) The normality test resulted in a score of 0.087 ( $> 0.05$ ), pointing out data were normal. The validity test resulted in a score of 0.939, showing validity. The reliability test resulted in a score of 0.950, suggesting reliability, 5) Users gave a mean score of 3.65 with a “good” category during the small test, and 6) The large group gave a mean score of 4.47 with a “very good” category. After passing the above research stages, our final app product “Act.Fit” was ready to use by society in the next-year research.

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