Calculations of Energy Athlete Based on Android Application

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Article Info	Abstract
	This study aims to build energy-based athlete calculator application needs, by knowing the energy needed every day, can find out how much energy is released each day and can set the number of calories eaten by knowing the number of calories issued. This research uses research and development method. At the start of opening the app, the user enters the application next the application menu consisting of the next two menu buttons that are the application usage tutorial and calorie counting. In the input menu data calorie needs calculation there are several columns that must be filled by the user are: name, age, weight, height, gender, activity category, sport type, frequency of exercise in every week, duration of exercise per day in minutes, exercise, weekly exercise frequency, exercise duration per week. After input data is filled, then press process button to know the result of caloric requirement. Preparation of application of energy needs of athletes based on android stages as follows: Potential and Problems, Data Collection, Product Design, Design Validation, Design Revision, Product Trial, Product Revision, Trial of Use, Product Revision, and Mass Production.

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INTRODUCTION

Man is inseparable from moving every day, therefore the nature of living things is moving. Without realizing a little or much of every human movement will release energy, depending on the activities performed every day. Moreover, an athlete who has a schedule of exercise that must be undertaken on a regular basis so that requires the energy needed for the exercise. Energy spent should be the same as the intake or food that is eaten every day.

To know and keep the food in the balance to eat is equal to energy derived from food or food intake, it must know how to calculate energy needs. Each person's energy needs vary, depending on various factors such as "Age, sex, weight and height, and the severity of daily activities" (Irianto, 2007).

The calculation of energy requirements, will be more quickly known when using technology that has developed at this time. Calculations can be computerized with the latest applications.

Android-based smartphones, already widely used by the general public, so it will make it easier to use it on a smartphone that has. By using android-based applications, in addition to simplify but will more quickly know the number of calories issued each day, either for athletes or people who regular activities are done everyday.

Energy can be defined as power or ability to work (Beck, 2000). Meanwhile, energy according to Cakrawati and Mustika (2014) is "Substance needed for living things to sustain life, support growth and physical activity".

According to the Department of Nutrition and Public Health (2014) energy derived from food is needed by humans to: (1) basal metabolism, (2) physical activity, and (3) food effects (Specific Dynamic Action/SDA).

The components required for the calculation of energy needs according to Ministry of Health RI in the guidebook of Achievement of Sports Nutrition (2014) are "Basal Metabolic Rate (BMR), Specific Dynamic Action (SDA), Physical Activity, Energy Expenditure for each type and duration of exercise".

Basal Metabolic Rate (BMR), according to Muchtadi (2009) is "The metabolic energy of a subject in both physical and mental resting conditions and has a normal body temperature as well as in a 'post-absorptive' state that is 12 hours after the last meal. According to Mann, J., & Truswell, A. S. (2012) that "Basal metabolism represents the energy necessary to maintain the fundamental processes of life; basal metabolism includes breathing, circulation, repair and renewal of ionic tissue and pumps". According to Rahmawati (2015) basal metabolism is "The amount of energy used for the activity of body tissues during physical and spiritual rest".

Specipic Dynamic Action (SDA) according to Ministry of Health RI in the Guidance of Achievement Sports Nutrition (2013) is "Energy needed to digest macro nutrients". According to Almatsier (2009) and Cakrawati & Mustika (2014) are "The additional energy the body needs for the digestion of food, absorption and metabolism of nutrients that produce energy". According to Hidayati (2015) and Rahmawati (2015) is "The use of energy as a result of the food itself".

Physical activity is the energy required by all the muscles involved in the activity plus a bit of energy required due to an increase in heart rate and breathing during heavy activity (Muchtadi, 2009). According to Irianto (2007) daily activities are "Daily routine activities, including exercising activities".

According to Darytamo (2007) that "In mobile application programming various technical aspects of the device is more prominent because it has many limitations compared to conventional computer or personal computer". According Hermawan, S. (2011) android is "Operating system developed for Linux-based mobile devices. Initially the operating system was developed by Android Inc. which was later purchased by Google in 2005".

There are several studies on calorie calculations that have been done by some researchers in the journal of sports and have been published, research conducted by Perwira, R. I. (2014) with the title "Expert System Prototype to Determine the Number of Calorie Diet for

Diabetes Mellitus Patients". While Rosmalina, Y (2011) with the title "Comparison of Basal Calculations and Energy Expenditure on Elderly".

Fitriyanti, A. D. (2016) under the heading "Calorie Counter Application Burned When Exercising Bicycle Using Android-Based Global Positioning System (GPS)". Meanwhile, Supono, R, A, Karmilasari & Wulandari, Y. D. (2015) entitled "Application of Nutrition Requirement for Elderly Based Android Smartphone".

METHODS

This research uses research and development method. The location of this study was conducted at Siliwangi University Tasikmalaya in May 2017.

The steps of Research and Development method Sugiyono (2016), more details can be seen in Figure 1 as follows.
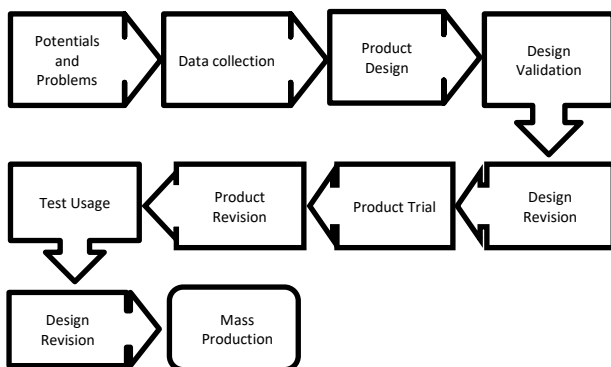
Figure 1. Steps to Use Research and Development Methods (R & D). Sugiyono (2016)

Explanation of the steps of the use of Research and Development Methods are as follows:

The data obtained from this study is quantitative data that will be transformed into qualitative, which aims to provide an overview of the quality of energy calculation needs of android-based athletes developed. While the subject of research for the trial is the target use of products that are athletes who are in Tasikmalaya City.

The stages in this product trial include: (1) establishing a test design, (2) establishing test subjects, (3) assigning data types, (4) assigning instruments, (5) data analysis techniques. While the instruments used to collect data in this study in the form of questionnaires, and interview guidelines. Questionnaire is used to know the quality of the products produced. An interview instrument is used as a data gathering tool from experts in relation to criticism, suggestions and improvements that are beneficial to the quality of the product.

The validity of the data that is on the validity and reliability. Validity and reliability in research and development calculation of energy needs of this android-based athlete is data obtained through trial activities are classified into two, namely quantitative and qualitative data. Qualitative data in the form of suggestion criticism presented by media experts and material experts, and athletes. Meanwhile, the quantitative data will be transformed into qualitative. The data is used to provide an overview of the quality of applications energy demand athletes calculations based on android.

Quantitative data analysis techniques in this study using descriptive stastistic analysis, in the form of statement is very less, less, good enough, good and very good that is converted into quantitative data with scale 5 that is with scoring from the numbers 1 to 5. Steps in data analysis among others: collecting rough data, scoring, scores obtained then converted into values with scale 5.

RESULTS AND DISCUSSION

Research and development of this application is to develop a way of calculating the energy needs of athletes based on android applications. By knowing the energy or calories needed every day, athletes and the general public can find out how much energy is spent every day, and can set the number of calories eaten by knowing the number of calories issued.

This development research refers to the development model of Borg & Gall that is limited or simplified at some stage only. The stages are as

follows: (1) Information gathering stage, (2) planning stage, (3) product development stage, and (4) validation and trial stage. Below is an explanation of each step taken in this research and development:

Information Stage

This stage begins with the collection of information in the form of material that will be developed in the application of energy needs of athletes based on android. After the developed material has been determined then the next step is to do literature study to collect material athlete's energy needs.

Planning Stage

This second stage consists of making the grating of research instruments that become the criteria for the assessment and development of energy applications based on android athletes. The completed instrument grille is then developed into a research instrument. The research instrument that will be used is validation sheet, observation sheet and interview guide. The validation sheet is used to determine the app's appropriateness based on the assessment of material experts and media experts. The material expert provides research based on material and linguistics while the media expert gives an assessment based on the programming and display aspects. Observation sheets and interview guides are used to determine responses and responses of athletes in the Tasikmalaya City environment regarding the use of android based applications.

Product Manufacture and Development Stage

At this stage is done product design application of energy needs of athletes based on android. The results of the design of the application of energy requirements based on android athletes are application interface, database, DFD (Data Flow Diagram), ERD (Entity Relationship Diagram), UML (Unified Modeling Language), and system flowchart. The results of the design, described as below:

1. Results Interface Design

The interface is used to facilitate communication between users with the application system. Here is the interface design in the application of energy needs of athletes.

2. Interfaces Home

On the home page there is a menu to enter the application.

Figure 2. Interface Home

3. Interface Menu

On the menu page there are 2 menu options are as follows:
   a. Tutorial application usage
   b. Calculation of calories

Figure 3. Interface Menu

4. Interface Calculations of Energy

On the calculator page of energy needs there are some menus. The input menu that must be filled by the user that is: Name, Age, Weight, Height in meters, Gender, Category of Activities

Figure 4. Interface Calculations of Energy

5. Interface Calculations of Energy

On the calculator page of energy needs there are some menus. The input menu that must be filled by the user that is: Type of Sports, Frequency of Sports/Week, Duration of Sports/1 Day, Type of Exercise, Frequency of Exercise/Week, Duration of Exercise/1 Day.

The output menu that will give results from the calculation, namely: IMT (Body Mass Index), BMR (Basal Metabolic Rate), SDA (Specific Dynamic Action), Energy Activity, Energy Exercise a Week, Energy Exercise Daily. (Figure 5)

6. Page Calculator Activity Interface

On the activity calculator page there are several menus:Process menu, Delete menu, Menu Output that will provide information on the results of the data input, namely: Energy Activity, Energy Exercise/Week, Energy Exercise/Day Total Energy Requirement/Day. (Figure 6)

Figure 5. Interface Calculations of Energy

Figure 6. Page Calculator Activity Interface

Stage of Trial

Validation stage is done so that application of energy requirement calculation of athletes designed and developed can be known feasibility

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based on the assessment of material experts and media experts. Application validation is performed by: (1) competent material experts in Sports Nutrition Science, and (2) competent media experts in the field of applications based on android. Validated application products are subsequently revised in accordance with expert advice and input during the validation process.

After the application is completed revised, then conducted a test phase conducted by athletes in the environment Tasikmalaya City. During the test phase, the researcher observed the use of the application. After using the application of athletes in the environment Tasikmalaya City interviewed to be asked responses, suggestions, and comments about the application developed.

Before the trial test, the application of the athlete's energy needs calculations developed, validated first by the material expert. Material validation is done by the lecturer of PJKR FKIP of Siliwangi University who have expertise according to the material.

Validation by experts aims to obtain information, criticism, and suggestions for applications that are designed and developed into a quality product. The validation results can be seen in table 1.

Once the user downloads Calorie Calculator app on Play Store, will display click to enter the application, then the application menu consisting of the next two menu buttons is the application usage tutorial and calorie counting.

In the input menu data calorie needs calculation there are several fields that must be filled by the user that is: name, age, weight, height, gender, activity category, sport type, frequency of exercise in every week, the duration of exercise per day in minutes, type of exercise, frequency of exercise week, duration of exercise per week.

After the user completes the data in the data input columns, the user is required to press the process button to determine the caloric needs of the results accompanied by Body Mass Index (BMI), Basal Metabolic Rate (BMR), Specific Dynamic Action (SDA), energy activity, energy exercise/week, exercise/day energy and total energy/day needs.

To delete data in the data input field, the user can press the delete button that is on the right side of the process button. With the application of this calorie needs calculation, the user will easily know the needs of caloric intake in accordance with individual characteristics.

Table 1. Validation Results

Aspect	Indicator	Value
Instructional	There are instructions for using the app	4
Data Input	Ease of understanding the ways of filling the data to be processed or calculated	4
Data Input	The data components presented in the menu correspond to the energy requirement counting material	3
Data Process	The calculation steps are according to the calculation formula expressed by the nutritionist	4
Compatibility	Compatible with various types of android smartphone	3
Compatibility	Screen resolution can adapt in portrait and landscape positions	3
Compatibility	Each data entry field can be seen clearly	4
Compatibility	App file sizes do not take up much space in smartphone memory storage	4
Data Output	The calculation results can be easily understood by the user	4
Data Output	The resulting data is clearly visible on the smartphone screen	4

CONCLUSION

Creation of energy demand applications based on android athletes using the following steps: Potential and Problems, Data Collection, Product Design, Design Validation, Design Revision, Product Trial, Product Revision, Trial of Use, Product Revision, and Mass Production.

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