The Development of Androids Application to Determine the Size of Indonesian Women Clothes Based on Indonesian National Standard (SNI)

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Abstract: During this time, process to determine the standard size of Indonesian women body is considered less practical. People need to take a look at the list of women clothes size based on Indonesian National Standard (SNI). With this clothing gauge application, it is one of the right solutions, practical and in accordance with the current digital era. This research includes development research that uses the ADDIE model, in this article which is discussed only up to the implementation or trial stage. The trial of developing an Android-based application to determine the size of Indonesian women's clothing based on the Indonesian National Standards (SNI) will be carried out on 52 students in the Fashion Program of Universitas Negeri Malang. Before the trial or implementation phase, the analysis, design, and development stages are first carried out. The trial results showed 88.38% of applications included in the criteria very feasible. Based on the results of field test results, students think that this application has a presentation that is easily accessible on smartphone, easy to use and understand, practical, has an attractive appearance, is not boring, and makes the spirit to learn.

1. Introduction

Actually there have been several similar studies, but the same research does not exist, because research is easier to operate, only writing a few body measurements will immediately appear the standard body size, besides that this study also uses the standard size of Indonesian women (SNI). Some of these similar studies are about: 1) Aplikasi untuk Mengukur Baju Dengan Sensor Ultrasonik.(Application For Measuring Clothes With Ultrasonic Sensor) [6], Aplikasi Augmented Reality Sebagai Alat Pengukur Baju Wisudawan Wisudawati Di Universitas Dian Nuswantoro (Augmented Reality application As a Measuring Tool for Graduates Clothing Graduation at Dian Nuswantoro University) [7], and 3) Proses Pengukuran Pembuatan Baju Berbasis Android (The Measurement Process for Making Clothes Based on Android) [5].

Determining a person’s body measurement, especially for Indonesian women, is done based on Indonesian National Standard (SNI). The Indonesian National Standard (SNI) is indeed the only standard that applies nationally in Indonesia. SNI was formulated by the Technical Committee and determined by the National Standardization Agency of Indonesia (BSN). The National Standardization Agency (BSN) was formed by Presidential Decree No. 13 of 1997 perfected by Presidential Decree No. 166 of 2000 concerning Position, Duties, Functions, Authority, Organizational Structure and Work Procedures of Non-Departmental Government Institutions as amended several times and the latest by Presidential Decree No. 103 of 2001, is a Non-Departmental Government Institution with the main task of developing and fostering standardization activities in Indonesia [12]. Standardization for the size of Indonesian women's clothing is listed in SNI 08-0388-1998. [10]

By knowing the clothing size, it will be easier for someone in making or choosing clothes to be made. All this time, to find out what the standard size of Indonesian women's bodies is still manual, by checking its size on the size stated in SNI. Because it is less practical and efficient, an Android-based application development will be made to determine the size of Indonesian women's clothing based on the Indonesian National Standard (SNI) in this research. This application is very useful for those who are engaged in fashion, both in industry, and in educational institutions. Thus, to find out whether the application is declared feasible or not, a trial will be conducted on students of the Fashion Program at Universitas Negeri Malang, because the application can be used by students for their lecturing.
The specifications of the product to be developed in this study are: 1) The product developed is an Android-based clothes measuring application, 2) The product will be used for learning in one of the relevant subjects, 3) The content of clothes measuring application product contains of text and images that make it easy for participants / students to calculate important aspects in clothes measuring, 4) Products can be downloaded via Playstore, with a minimum device/ smartphone specification of Android OS 7.0 (Nougat), minimum of 1GB RAM, and minimum of 500MB free space to run the application, 5) UI and UX products are developed with the help of third-party applications, namely: CorelDraw, Construct2, and Cordova, and 6) The product has a splash page/ loading page, then the main menu has 3 menus, namely: a) Measure; which is a menu where we enter the values of body circumference, waist circumference, and hip circumference, b) instructions; that is, a menu for guidelines for using the application that has 2 submenus: Instructions for use, and How to measure, and c) Exit; is a button to exit the application.

Shortly, the step is the users by using a meter to measure their body, then input it into the size application required, and the result will appear the size of the clothes, starting from the smallest to the largest size (S, M, L, XL, XXL, XXXL, and XXXXL). The application that has been made will later be distributed on the Google Play Store. Because it is based on Android, and then the users just download it.

2. Methodology

According to [9], research development method is a research method used to produce certain products and test the effectiveness of the products. Research development carried out in this study uses the ADDIE Model developed by Dick and Carrey. ADDIE model consists of 5 stages, namely: Analysis, Design, Development, Implementation, and Evaluation. The analysis phase is analyzing the problems that occur so that the media to be developed is more effective and efficient. Design Phase, which can be in the form of a learning media design that is still conceptual and will underlie the next development process. Development Phase, which contains of product design realization activities, then before going to the implementation phase, expert validation tests need to be done first. Implementation phase is implementing the media design in real situation, in this case looking at the student's assessment of the product that has been developed. The Evaluation Phase is carried out until formative evaluation that aims for revision needs. In accordance with the title of this article, the discussion in this article is focusing on the results of the trial. Thus, for the previous stage, namely the analysis, design, and development stage, it was only discussed in broad outline.

In the Analysis phase, it was found that while determining the standard body size of Indonesian women was done manually, namely by measuring the body then only looked at the list of Indonesian women's body size based on SNI standards. This is, of course, less effective and efficient because one must first look at the list of standards based on SNI which not all people have it. Thus, an Android-based application needs to be created so that it is more practical and efficient, because it can be brought anywhere and almost everyone has a smartphone, and is very useful both for people engaged in the fashion industry and the public especially for women.

Design Phase, is carried out in order to facilitate the process of making an Android-based application to determine the size of Indonesian women's bodies based on SNI. In this case the draft will be made in the form of a story board. The intended storyboard here is a rough outline of the appearance of an android-based application product that will be made, so that an overview of the appearance of the application can be seen.

The Development Phase in the ADDIE model contains of product realization activities. After the product development process in the form of an android-based application is complete, an expert validation test is needed. The validation test is carried out by media experts and material experts. The analysis results of the validation of material experts as a whole are obtained by Total Empirical Score (Tse) of 34 from the Total Maximum Score (Tsh) of 36, so it gets, a percentage of results from material experts of 94.44% which are included in the very feasible criteria. The results of the data analysis of the validation of the media experts as a whole obtained an Empirical Total Score (Tse) of 36 from the Maximum Total Score of 36, so that the percentage of results from the media experts is 100% which is included in the criteria of very feasible.

Implementation phase or trial phase, this stage is carried out if the appearance of the application display product that has been made has been revised and has been declared feasible by the media experts
and material experts. At the implementation stage, a trial will be conducted on the Fashion Program students of Universitas Negeri Malang, including a questionnaire to obtain an assessment of an android-based application to determine the standard size of Indonesian women's bodies based on SNI. The students consist of S1 students of Fashion Education Program and Diploma 3 (D3) of Fashion Program. For the trial, only one class was taken from each of the programs which were chosen in a lottery. After the draw, it was obtained from S1 Fashion Education students, the off A class of 2018 intake for 29 students, and from the D3 Fashion Program students of 2018 intake for 24 students. Furthermore, all of the research subjects would all be subjected to trials, because less than 100 people [2].

The type of data obtained in the form of quantitative and qualitative data. Quantitative data is data obtained from a questionnaire resulting from validation and testing. While qualitative is obtained from the description of comments and suggestions from the validator and students. The data obtained is used to determine the feasibility of the product being developed.

The research instrument of data collection was in the form of a semi-closed questionnaire consisting of several alternative answers and comments or suggestions columns. In this study questionnaire is as an instrument given to media experts, material experts, and students as test subjects. This study uses a Likert scale to measure the feasibility of the android application media. The answers of each instrument are weighted at intervals of 1 to 4 to avoid hesitate answers. The following Likert scale criteria are used in research.

| Number | Quantitative Meaning                                      |
|--------|-----------------------------------------------------------|
| 4      | Very good/Very Feasible/Very Easy/Very Suitable/Very Interesting/Very Precise |
| 3      | Good/Feasible/Easy/Suitable/Interesting/Precise          |
| 2      | Quite Good/Quite Feasible/Quite Easy/Quite Suitable/Quite Interesting/Quite Precise |
| 1      | Less Good/Less Feasible/Less Easy/Less Suitable/Less Interesting/Less Precise |

Table 1. Criteria of Scoring Scale Likert [2]

For data analysis, both for material experts and media experts as well as the trials, it is using equations that were adapted from [1].

\[ V = \frac{Tse}{Tsh} \times 100\% \]

Information:

- \( V \) = validity
- \( Tse \) = total empirical score
- \( Tsh \) = maximum total score

Media Feasibility Criteria for Trials on Student

Number of items = 8
Highest score = 4
Lowest score = 1
Number of interval classes = 4

Calculation:

Difference Score (SS) = Maximum score - minimum score
\[ = (8 \times 4) - (8 \times 1) \]
\[ = 32 - 8 \]
\[ = 24 \]
Achievement Interval (IN) = Difference in score
\[ \sum \text{Interval classes} \]
= 24/4
= 6

Percentage Interval Validation (IV) = \( \frac{\text{score achievement interval}}{\text{Maximum score}} \times 100\% \)
= \( \frac{6}{32} \times 100\% \)
= 18.75%

The percentage interval results obtained are then used to determine the level of feasibility criteria for android application media. The following levels of feasibility criteria for trials are outlined in Table 2.

| No. | Percentage | Criteria      | Information       |
|-----|------------|---------------|-------------------|
| 1   | 81.25% - 100% | Very Feasible | No Revision       |
| 2   | 62.5% - 81.24% | Quite Feasible | Minor Revision    |
| 3   | 43.75% - 62.4% | Less Feasible | Partly Revision   |
| 4   | 25% - 43.74% | Not Feasible  | Total Revision    |

3. Results of the Study

The trial data was obtained from a small group trial conducted on 53 students of Fashion Program Universitas Negeri Malang. The trial was conducted on April 27, 2020. Following is the presentation of the trial data which includes material presentation aspects and attractiveness aspects.

| No | Indicator | Tse | Tsh | V-ah | Information       |
|----|-----------|-----|-----|------|-------------------|
| 1  | The application is easy to access in smartphone | 185 | 212 | 87.26% | Very Feasible    |
| 2  | The application is easy to operate            | 195 | 212 | 91.98% | Very Feasible    |
| 3  | The application is easy to understand         | 195 | 212 | 91.98% | Very Feasible    |
| 4  | The application can be used at every time and everywhere | 192 | 212 | 90.56% | Very Feasible    |
| 5  | The application has an interesting display    | 190 | 212 | 89.62% | Very Feasible    |
| 6  | The application makes it easy to determine the standard size of Indonesian women based on SNI | 196 | 212 | 92.45% | Very Feasible    |
| 7  | The application is not boring                 | 174 | 212 | 82.07% | Very Feasible    |
| 8  | The application creates enthusiasm to learn    | 172 | 212 | 81.13% | Quite Feasible   |

The following are suggestions or comments obtained from the results of the field trials of the Fashion Program Universitas Negeri Malang. In general, the application is very interesting and makes it easy for the users, but there are settings or instructions for usage that are still confusing. In addition, the application can also be completed with animation, background music, and/or the sound button and the addition of size options for men and children along with an explanation. Other suggestions, this application not only can be installed for Android-based smartphones, but also for IOS-based smartphones.

Analysis of field trial data is derived from the data obtained by each of the questionnaire indicators presented in Table 3. The questionnaire consisted of 2 aspects of assessment namely presentation of
material and attractiveness. Following is the results of the analysis of trial data which have been divided according to aspects of their assessment.

### Table 4. Analysis of Field Trial Data

| No | Assessment Aspect       | Tse  | Tsh  | V-ah (%) | Information       |
|----|-------------------------|------|------|----------|-------------------|
| 1. | Material Presentation   | 767  | 848  | 90.45%   | Very Feasible     |
| 2. | Attractiveness          | 732  | 848  | 86.32%   | Very Feasible     |
|    | Total                   | 1499 | 1696 | 88.38%   | Very Feasible     |

![Figure 1. Bar chart of the results of field trials](image)

### 4. Discussion

Based on the results of the field trials, in Table 4, the material presentation aspect obtained an Empirical Total Score (Tse) of 767 from the Maximum Total Score (Tsh) of 848 with a percentage of 90.45% which included very feasible criteria. According to these data, the android application for determining women's dress sizes based on SNI is very easily accessed by smartphone media. This is in accordance with the opinion [13] that one of the characteristics of good learning media is that easy to use learning media is. It is shown that these applications can be easily found and downloaded from the Google play store. The operation is also very easy because in the application there is a menu of usage instructions which is presented in a language that is easily understood by students. This application is also easy to understand, so it is not difficult for the users. Mentioned that learning media is useful to clarify the presentation of messages and information so as to facilitate the learning process [3]. Likewise, according to [8], the learning media functions to clarify the presentation of material and stimulate the learning process of students. Besides this, application is not limited in place and time, which means the android application to determine the size of women's clothes based on SNI can be used anytime and anywhere. Smartphone media that are easy to carry anywhere because of their small size makes it possible. It is in accordance with [8] that learning media has flexibility, that is, the media can be used anytime and anywhere.

The attractiveness aspect gained a total Empirical Score (Tse) of 732 from the Maximum Total Score (Tsh) of 848 so that a percentage of 86.32% was obtained with very feasible criteria. According to students, 3 indicators out of a total of 4 indicators on the attractiveness aspect are included in the very feasible criteria and 1 other indicator items in the criteria is quite feasible. Overall, the android application for determining women's dress sizes based on SNI has a very attractive appearance. The design with a combination of colors and layouts that are presented in such a way makes students not easily feel bored in using it. The application can be used continuously or frequently so that the understanding of material by students will be maximal. This android application makes the students...
very easy for to determine the size of women's clothes based on SNI. Learning material that is packaged simply in this application makes it easy for students to determine the size of the clothes. The presentation of this android application is enough to increase the enthusiasm of learning for students. Android-based learning media provides new and interesting experiences for students in their learning activities. As it is known that good media selection is an attractive display quality, provides valuable experience to students, and learning outcomes increase [4]. This is reinforced by statement [10] that learning media must meet the attractiveness criteria, this is intended so that students are enthusiastic to learn.

The results of the overall field trial analysis of the data obtained Total Empirical Score (Tse) of 1499 from the Total Maximum Score (Tsh) of 1696, so that it obtains a percentage of results of 88.38% which is included in the very feasible criteria. Based on these results, according to the students, the android application to determine the size of women's clothing based on SNI that has been developed is feasible and can be used in learning.

Based on the recommendations of the trial results, several revisions have been made as following: 1) simplifying instructions for use, 2) adding sounds, and sounds to the buttons, and 3) further applications can be used also for smartphone based on IOS. Based on the results of these suggestions, improvements have been made, especially in the instructions for use to be made easier and clearer, and adding a sound button. For suggestions so that it can be used on smartphones based on IOS, this can be proposed for further researchers, because this research is more emphasized on android users. Below are some views from the android applications:

![Android Application Screenshots]

Figure 2 Display Application Based On Android To Determine The Size Of Indonesian Women Clothes Based Indonesian National Standard (SNI)

5. Conclusion

Based on the analysis results of trials conducted on students of the Fashion Program at Universitas Negeri Malang, it can be concluded that an android-based application to determine the size of Indonesian women's bodies based on the Indonesian National Standards (SNI) is declared very feasible to use. The feasibility of this application is shown from the results of the analysis of the trial results seen from the aspect of presentation and attractiveness obtained a total percentage of 88.38%, so that the application is declared very feasible to use.

This research and development product is expected to be developed with a broader scope, such as the material for determining the size of men's and children's clothes based on SNI. It needs to be developed not only for Android-based smartphones, but also for IOS-based ones such as the IPhone.
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