

General Preparatory Exercise Program Based on Android Tennis Sports

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Abstract This research explores the general preparatory physical exercise program using Android for Volta Club tennis players and students of sport science faculty, Universitas Negeri Medan. This research adopts the method of the research and development model Borg and Gall. The development procedure used includes several stages: 1) recognizing the content of the product being developed, 2) developing the initial product, 3) expert validation. The data analysis technique used in this study was done in two ways, namely quantitative and qualitative. In this article, the data used is only at the validation stage of material experts and media experts. Based on the results of the material expert validation regarding the product, it can be obtained as follows: assessment of the material aspect obtained 86.70 % (Very Feasible), the aspect of human resources for sports personnel obtained 96% (Very Feasible), the mechanism for implementing the physical exercise program was 90% (Very Feasible), and the overall percentage was obtained 95.4% (Very Worthy). Next is the assessment of media experts from various aspects: Display 72.2% (Decent), Coloring 77.7% (Very Decent), Images (Photos/videos) 80% (Decent), Fonts 80% (Very Decent), Menu 80% (Decent), Ease 73.3% (Eligible), and the usefulness of the 96% aspect of the media expert's assessment stated that the android-based general preparation physical exercise program application media was very feasible. The overall percentage obtained is 79% with a decent category.

Keywords General Preparation, Exercise Program, Tennis Sports, Android

1. Introduction

Higher education is directed at the development of science and technology, as well as improving the welfare of the community and the competitiveness of the nation. In this research, program targets and program performance indicators that are directly related to research outcomes and community service points 3 and 4 explain increasing the relevance, quality, and quantity of science and technology and Higher Education resources, as well as increasing the relevance and productivity of research and development. So in this case, universities are required to research with more emphasis on increasing the relevance, quality of research, and quantity of the development of science and technology and development of science and technology resources.

Development is a research method that produces a product in an area of expertise particularly, followed by certain by-products and has the effectiveness of the product. Development Research is research that produces a product that has been analyzed first for its effectiveness and has been designed, evaluated with the results of the development model [1,2]. Research and development

methods are research methods used to produce certain products and test product effectiveness [3,4]. This is further confirmed by the research of Paul Ford et al., explaining that by using the development of appropriate exercise stimulation (product development) its relationship to the natural growth and maturation process by using the concept of a "return window" to accelerate and improve physical development [5]. In this case, development research is research that produces renewal products that were previously designed, tested, analyzed for effectiveness, and disseminated to the public.

In this digital era, a breakthrough is needed for development in the field of sports to be able to easily achieve the goals of the sport. The fact that technology plays a much larger role in the digital era than it did for previous generations has made today's generation have a high level of technological literacy [6]. With this change, it is hoped that the success of sportspeople who are more advanced and modern, so that sports infrastructure is needed globally [7]. The increasing number of human needs makes humans creative and innovate by developing technology and creating new pathways for sports organizations through developed infrastructure [8]. Researchers see from what is the reality on the ground, especially in North Sumatra, there has never been facilities and infrastructure of a technology that makes it easier for coaches and athletes to carry out training programs, in this case, the sport of tennis.

This was emphasized by Firmansyah, a State-Owned Enterprise employee who is a former international athlete at his time and currently serves as Head Coach and Person in Charge of the Volta Tennis Club (VTC), who said "Tennis is a sport for the upper middle class. So far in Indonesia, getting tennis court athletes is quite difficult because there are athletes who meet the criteria, but parents who are financially incapable, or financially very supportive, but these athletes are less talented". This systematic review proves that technology provides a method that is well-accepted for parents with an interesting form of exercise; its implementation is also very high, both through supervision and no supervision, whose implementation is for 12 evaluated weeks [9]. And the results make it clear that 13 studies (59%) used commercially available systems for exercise programs: 4 (31%) used consoles Nintendo Wii with Fit/Sports games [9-13].

Then, confirmed by Gudo Siswoyo Gunri, who is the General Secretary of the Medan City (Persatuan Lawn Tennis Indonesia) PELTI that "In this present era where the Covid-19 pandemic is spreading, it is hoped that a breakthrough or development of a form of exercise that makes it easier for players, coaches or athletes to be able to practice independently with an exercise program using technology whether it's a cellphone, android or others. So that anyone can be biased and can master the sport of tennis." Researchers assume that at this time, apart from the Covid-19 pandemic problem, especially in the current

technological era, it is digital, so it is very useful for infrastructure to inform digital an increase in self-ability in exercising without supervision or with supervision.

Previous research has systematically shown that these forms or models of technology-based exercise are good for older people in exercising, and more research is needed to investigate the feasibility, acceptability, and effectiveness of technology-based training programs [9]. Based on the background of the problem from several sources, this research wants to explore the truth and effectiveness of a digital development that is used as an infrastructure for the implementation of an exercise program, where the aim is to simplify and increase skills in the sport of tennis.

2. Material Methods

The development method used in this research is the adoption of the Borg and Gall development model with 6 steps. This was done due to time and cost constraints. This is supported by the statement that research and development can be stopped until a final draft is produced, without testing the results [14]. The results or impacts of implementing the development of movement activities already exist in group trials and limited trials. The stages in this research can be presented as follows:

- a) Needs analysis: literature study, observation and needs analysis. In the needs analysis, the researcher conducted interviews with coaches and several sources of former North Sumatran athletes, and based on several journals that were relevant to current problems.
- b) Planning: general preparatory exercise program based on android for tennis. Product design planning is carried out to finalize the research to be carried out. The steps taken for product design planning are: planning for making Android-based applications (a. Collecting data to create program data menus, data collection needs to be done to determine the menus that will be created in the application so that the program menus created can accommodate all elements of fulfillment standard process b) Design database using XMEYE software, program code generation using PHP 5 and HTML 5).
- c) Application development in the draft is initially validated by supervising experts and experts in information technology (consisting of 2 experts) so that this design is effective and efficient in its use. Then after making the draft initial, it continues to improve the design after receiving input from the experts who have been determined. Initial product design: program general preparatory physical exercise creation, exercise video creation, and application development. The making of this training program is based on the training periodization theory from Bompa, where the training program is for the physical form of athletes in preparation general. Next

is the making of videos or pictures of the forms of physical exercise in the general preparation phase. Then these forms of physical exercise are entered into the android application which will later be used for independent training.

- d) Revise the product; After getting some input and suggestions on the implementation of the Focus Group Discussion (FGD), the product of this research was perfected by following the input and suggestions that had been given.

Furthermore, after the draft of the exercise program application has been designed, validation of the program application design was carried out, involving 2 (two) material experts and experts media for the exercise program application. The application development carried out by the researcher is an idea created based on the needs of the trainer and customer, which then the researcher submits and conducts discussions to several experts and validators to get input or revisions related to an exercise program android-based general preparatory physical that will be developed to improve the results of the research conducted. The data analysis technique used in this development research is to use a descriptive technique in the form of a percentage. In data processing, the percentage is obtained by the formula of [15]:

$$NP = \frac{n}{N} \times 100$$

NP = Value in %.

N = Value obtained.

N = Total value/sum of all data.

The percentage results obtained then classified to obtain data conclusions. The following table, 1 will present the classification in percentage [15].

Table 1. Percentage Classification

Percentage	Criteria	Classification
0 - 20%	Not Good	Not Eligible
20,1-40%	Less Good	Less Eligible
40,1-70%	Fairly Good	Fairly Decent
70,1-90%	Good	Decent
90,1-100%	Very Good	Very Decent

3. Result and Discussion

Result

Researchers carry out development activities starting from a design that is not clear but continues to be

developed while continuing to make improvements and involving several parties including users of the product developed. Activities start from systematic, neat, and clear planning, including the purpose of android-based applications. The relevance of the problem in the background of the problem, theories that support the research process and suggestions from experts provide good direction in the research process and making applications. Product development is a subjective understanding of a producer of "something" that can be offered as an effort to achieve organizational goals through meeting the needs of the training program. Objectives and user desires, following the competence and training capacity and motivation of users in independent training.

Validation Material

The researcher validated the application design involving a material expert, namely Dr. Budiman Agung, M.Pd is physical trainer tennis at Regional Student Education and Training Center Bogor Regency and west Java Physical Trainer and Australian Strength and Conditioning Association ASCA level 1 certified as material. From the results of material expert validation, it can be seen in Table 2.

Table 2. Results Material Validation

Respondent				
Respondent	1	2	3	Amount
Of Experts Material	29	24	9	62
Percentage	86,70%	96%	90%	95,4%

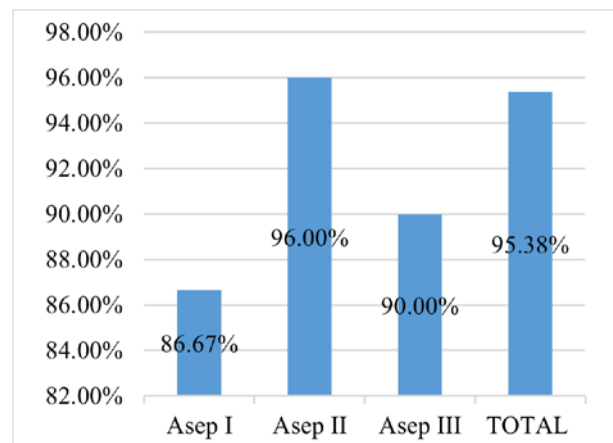


Figure 1. Expert Validation Results Materials

Based on the results table 2, it can be seen the histogram of the percentage of supervisory expert assessments of application products, as shown in Figure 1.

Products that were developed previously must be

validated by experts to determine the feasibility, weaknesses, and strengths of the resulting product. Validation from material experts is in the form of assessments and suggestions for improvements needed so that the material aspects of the products developed are feasible. Based on the results of discussions and initial assessments from material experts regarding the product, it can be obtained as follows;

1. Assessment of the material aspect obtained 86.70% (very feasible),
2. Aspects of human resources for sports personnel obtained 96% (Very Eligible),
3. The mechanism for implementing the physical exercise program is 90% (Very Eligible),
4. The overall percentage was obtained at 95.4% (very decent).

Therefore, it can be concluded that following the previous problem formulation which touched on the effectiveness and efficiency of the product development of general preparation physical exercise programs based on Android, the content in product development is appropriate and effective in terms of the aspect of material expert assessment. It is stated that the general preparation physical exercise program application media has in a good category.

Media Expert Validation

On the validation of Media expert Fikri Aldi as a Modeling and Animation expert at the Smart School Vocational School, he assessed the application product for an Android-based general preparation physical exercise program, which can be seen in Table 3.

Based on the results table 3, it can be seen the histogram of the percentage of experts assessments supervision of

application products, as shown in Figure 2.

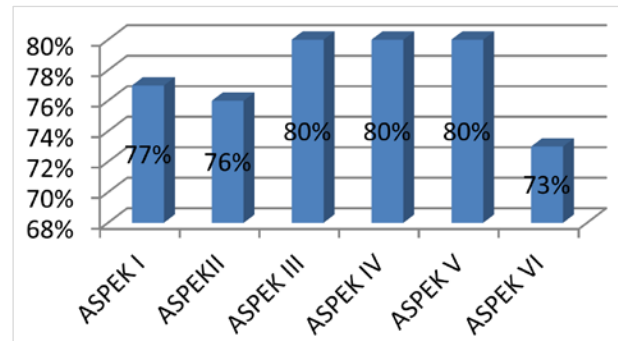


Figure 2. Percentage of Expert Assessment Results Media

Data is expert validation obtained by providing a questionnaire containing display aspects accompanied by the product. Media developed to media experts. In addition, media experts were given comments and suggestions general to improve the developed media so that it could be used as a product for general preparation physical exercise program applications. Assessment of media experts from various aspects is as follows:

1. Display 72.2% (Decent),
2. Dye 77.7% (very Eligible)
3. Image (Photo/video) 80% (Decent),
4. The letters 80% are very decent,
5. Menu 80% (Decent),
6. Convenience 73.3% (Decent)
7. The usefulness of the 96% aspect of the media expert's assessment stated that the android-based general preparation physical exercise program application media was very feasible.
8. Overall the percentage obtained is 79% with category decent.

Table 3. Results Media Expert Validation

Indicators Assessment								
Aspect	1	2	3	4	5	6	7	Amount
Of Media Experts	22	35	16	24	27	19	19	157
Percentage	72,2%	77,7%	80 %	80 %	80 %	73,3%	96 %	79 %

The results of media validation are guidelines for developing product quality applications for general preparatory physical exercise programs before entering trials individual. Suggestions and inputs were given by media experts on products physical exercise program application are:

1. Loading is too long.
2. There is a user display when loading.
3. The menu biodata on the dashboard/home does not need to be displayed.
4. The button terms/conditions and application guide cannot be accessed.
5. Need to add application usability information.
6. The buttons available on the dashboard cannot run when the button is pressed.
7. The button registrations a trainer does not run properly when pressed.
8. The search button on the trainer list doesn't work very well either.

4. Discussion

Products that will be developed previously must be validated by experts to determine the feasibility, weaknesses, and strengths of the resulting product. Validation from material experts is in the form of assessments and suggestions for improvements needed so that the material aspects of the products developed are feasible. Based on the results of discussions and initial assessments from material experts regarding the product, it can be obtained as follows; 1) Assessment of the material aspect obtained 86.70% (Very Eligible); 2) Aspects of human resources for sports personnel obtained 96% (Very Eligible); 3) The mechanism for implementing the physical exercise program is 90% (Very Appropriate); 4) The overall percentage is 95.4% (Very Decent). Therefore, it can be concluded that following the previous problem formulation which touched on the effectiveness and efficiency of the product development of exercise programs general preparation physical based on Android, the content in product development is appropriate and effective in terms of the aspect of material expert assessment. It is stated that the media general preparation physical exercise program application has in a good category.

Furthermore, the media expert who became the validator in this study was Fikri Aldi, an expert and modeling teacher at the Smart School Vocational School. Media expert validation data was obtained by giving a questionnaire containing display aspects accompanied by media products developed to media experts. In addition, media experts were given general comments and suggestions to improve the developed media so that it could be used as a product program application for general preparation physical exercise. Assessment of media experts from various aspects is as follows: display 72.2%

(Decent), coloring 77.7% (Very Decent), pictures (Photos/videos) 80% (Decent), letters 80% (Very Decent), menu 80% (Decent), convenience 73.3% (Eligible), the usefulness of the 96% aspect of the media expert's assessment stated that the android-based general preparation physical exercise program application media was very feasible, and the overall percentage obtained was 79% with a decent category.

The results of media validation are guidelines for developing product quality applications for general preparatory physical exercise programs before entering trials individual. Suggestions and inputs were given by media experts on application products physical exercise program are: loading too long;, there is a user display when loading;, the biodata menu on the dashboard/home does not need to be displayed;, the terms/conditions button and application guide not can be accessed;, required added information on the use of the application, the buttons available on the dashboard cannot run when the button is pressed, the button registration as a trainer cannot run properly when pressed, and the search button on the coach list also doesn't work well.

5. Conclusions

This development research was carried out in several stages, where the stages were carried out starting from the implementation of preliminary studies, product development designs, to the product validation and revision stages. Results of material experts assessment of material aspects obtained 86.70% (Very Feasible); 2) Aspects of HR sports personnel obtained 96% (Very Eligible); 3) The mechanism for implementing the physical training program is 90% (Highly Appropriate); 4) Overall percentage 95.4% (Very Appropriate), media expert assessment results Display 72.2% (Decent), Coloring 77.7% (Very Decent), Pictures (Photos/Videos) 80% (Decent), Letters 80 % (Very Decent), Menu 80% (Decent), Convenience 73.3% (Decent). So from the results of the validation of the two experts, it can be concluded that this exercise development research can be applied to trainers such as playing tennis. This research is effective and efficient as well as new findings so that originality is maintained.

6. Suggestion

Based on the conclusions above, it is recommended: (1) This research should be continued at a stage the next development, namely the trial stage and the implementation stage product. (2) On the implementation of the coach and player trials in maintaining physical condition as a tennis player as expected. (3) Development of Application. This android-based general preparatory physical exercise program can be disseminated through the

application Google Play Store after this research is completed at the product effectiveness stage. (4) This research is expected to be continued in the future of this research on trial people. (5) For the development of this research science as a reference for other research and teaching of Physical Condition courses and others. (6) The researcher would like to thank the Chancellor of the State University of Medan who has approved this research to be carried out. (7) This research received research grants from State University PNPB funds in Medan accordance with the Decree of the Head of LPPM Unimed number 123/UN33.8/KEP/PPKM/2021.

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