



The Development of Endurance Exercise in Developing the Training of Students Athletes in Jepara

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Abstract

Physical condition exercise has an important role to develop athletes' achievements, confidence, and readiness to face the challenges in exercise and competition. Thus, their physical conditions must be trained. In the field, coaches of the athletes must work harder to calculate and determine the accurate exercise program for the athletes. The processes require a longer time. This reality encouraged the researchers to develop the Latidan 21 application to facilitate the trainers in developing endurance exercise programs quickly and accurately. The researchers hope the program would be relevant to the capabilities of the athletes' skills and could improve the endurance of the PPAP athletes of the Jepara Regency. In this research, the researchers developed the product with Research & Development model proposed by Gall, Borg, and Gall (1996) with some adjusted needs based on the real situations. The research subjects consisted of an IT professional, a software programmer from Semarang, an IT lecturer of Unisbang, a Karate practitioner, trainers of National Sports Week for Central Java Karate, the Division Chief of Achievement Training Center of Indonesian National Sports Committee in Jepara Regency, and the various sample tests. The applied instruments were a questionnaire with a Likert scale, expert evaluation, product validation sheet, and interview guidelines. The developed product for the trainers, the athletes, and the constructors of the Jepara Regency was expected to improve endurance performance and human resources.

How to Cite

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INTRODUCTION

Jepara Regency has a Training Center of Leaner Athletes (PPAP), established by the Department of Education, Youth, and Sport of Jepara Regency to develop and train the school athletes. Thus, they will be ready for the next generations of Jepara Regency's athletes with various achievements at the Province, National, and International levels.

Successful training and sports achievements are the most targeted objectives by all sports practitioners. Most athletes and trainers expect successful training and achievements. The achievements of sports require maximum effort, such as training based on the needs. Training programs influenced the success of an athlete. The training refers to a process of systematic exercising in a repeated manner with more intentions for each session (Hermawan 2007; Pratama and Setyawati 2020).

Physical conditioning exercise has an important role to develop the achievements of the athletes (Abdussama, Aimang, and Bakar 2021; Yusup, Erawan, and Hermanu 2017). Excellent physical conditions lead to (1) improved circulation system and heart performance, (2) improved strength, flexibility, stamina, speed, and other physical components; (3) improved ergonomic movements of the body, and (5) improved recovery process of the organs, and (5) improved responses of human organs (Arjuna 2019). An excellent training program could also lead to better technique mastery improvements. Training on the techniques, tactics, and skills is important to maximize excellent outcomes. This statement indicates that repetitions during movement training or certain tactic pattern make an athlete durable.

Psychologically, a durable athlete has many advantages because the durability makes the athlete confident to encounter challenges in the training and competition. In martial sports, for example, Judo, excellent physical condition influenced the improved achievement of an athlete (Maulidya and Jannah 2021; Nisa and Jannah 2021; Trianingrum and Jatmiko 2021). Thus, the physical condition becomes an important factor to develop the athletes within a programmed and continuous training session. The dominant physical components in martial sports, according to Jusran (2021), consisting of 10 components. They are speed, strength, endurance, muscular power, flexibility, balance, agility, accuracy, reaction, and coordination. In this research, the researchers focused on endurance as the physical component of an athlete.

In a training program, physical programs must include endurance. The process of composing the endurance training should have

individual specifications focused on every athlete. This matter is important because the endurance training program is arranged from the initial conditions of the athletes. Thus, the program must be different among the athletes. In the field, coaches of the athletes must work harder to calculate and determine the accurate exercise program for the athletes. The processes require a longer time. A coach must recapitulate all the athletes' tests. Then, the coach determines the running speed of the athletes, measured by dividing the distance and the required time to cover the distance. Thus, the athletes would have improved cardiovascular capacity. With excellent endurance, the athletes would not be exhausted easily during the training and the competition. The excellent endurance would be also expected to improve the athletes' achievements.

This reality encouraged the researchers to develop the Latidan 21 application to facilitate the trainers in developing endurance exercise programs quickly and accurately. The researchers hope the program would be relevant to the capabilities of the athletes' skills and could improve the endurance of the PPAP athletes of the Jepara Regency.

In this research, the researchers prepared some previous studies that used electronic applications to train the physics of athletes.

Antoni & Suharjana (2019) developed the Android-based smartphone system to improve the health and fitness of the users. The results showed most users admitted the benefits of the application uses.

Putro, Suherman, and Sultoni (2018) developed the android-based application program for cardiovascular fitness and endurance. The results showed the developed application was reliable to use.

Listiandi et al (2020) used smartphone-based applications to improve cardiovascular endurance and self-efficacy. The results showed improved cardiovascular endurance and self-efficacy.

From the previous research, the implementation of the application influenced health, fitness, and physical endurance positively. Therefore, the researchers were encouraged to develop an application for coaches and athletes in Jepara. The researchers produced an application named Latidan 21 that would be accurate and effective for the coaches of the Training Center of Leaner Athletes in the Jepara Regency.

METHOD

This Research & Development produced an application named Latidan 21 for the coaches of the Training Center of Learner Athletes in Jepara and examined the effectiveness of the

product. In this research, the researchers developed the product with Research & Development model proposed by Gall, Borg, and Gall (1996) with some adjusted needs based on the real situations. The applied development procedures were 1) identifying the problem, 2) collecting the data, 3) designing the product, 4) validating the design, 5) revising the plan, 6) testing the product, 7) revising the product I, 8) promoting the trial test, and 9) promoting the final test.

In this research, the data sources were quantitative and qualitative data. (Purwanto et al. 2021) explain that quantitative data is the primary data taken from test results. Then, experts should analyze the test results. (Chong and Plonsky 2021) Explaining qualitative data are suggestions and recommendations of the experts so that researchers can revise the product design.

The research subjects consisted of an IT professional, a software programmer from Semarang, an IT lecturer of Unisbang, a Karate practitioner, trainers of National Sports Week for Central Java Karate, and the Division Chief of Achievement Training Center of Indonesian National Sports Committee in Jepara Regency, and the various sample tests.

The applied instruments were a questionnaire with a Likert scale, expert evaluation, product validation sheet, and interview guidelines. After collecting data, the researchers analyzed the data descriptively. Fauzi and Pradipta (2018) explain a descriptive analysis of an R&D research is useful to provide crucial information.

RESULTS AND DISCUSSION

Problem Identification

From the observation results, the researchers found that a percentage of 35% of coaches of Training Center of Learner Athletes in Jepara knew and understood exercise periods. Then, a percentage of 10% of the coaches understood how to calculate the endurance of the athletes. Most coaches provide endurance training without calculation and only used test results as the bases. When the coaches wanted to improve the Vo2max of the athletes, they had to use the MFT Balke formula or Cooper test to calculate. Thus, the coaches could notice the Vo2max capability of every athlete because this capability may vary. A coach must provide specific endurance training for every athlete based on the applied distance and time. A coach could use Balke or Cooper tests to determine the initial capabilities of the athletes effectively. The tests could be done at once with many athletes to make the administration efficient.

Training processes that violated the train-

ing principles would make the athletes at disadvantage. Therefore, a coach must arrange the training program and competition schedule by considering the applied training methods accurately. Then, the training had to be done based on the correct principles of training.

From the explanations, a coach should prepare the training properly, moreover during this industrial evolution era or 4.0 industrial revolution. Therefore, the profession of a coach is strongly correlated to integrity and personality. Moreover, this 4.0 industrial revolution brings significant effects on various sectors, including sports. On the other hand, the efforts to improve the competencies of sports coaches, especially in physics, must be done immediately. The role of a coach is to develop the science of sport and to encourage the athletes to reach their achievements.

Data Collection

The researchers collected the data from observation. The researchers observed the training program implementation and evaluation. Then, the researchers used the observation results and found the program planning process for the athletes. The researchers observed by looking at and analyzing the training program made by the coaches. Then, the researchers interviewed the man in charge of the Training Center of Learner Athletes in Jepara, the Disdikpora, or the Department of Education, Youth, and Sport of Jepara.

Product Design

The researchers developed the initial draft of Latidan 21 application with some features, such as account registration, account login menu, admin user (for the coach), training program, and logout menu. The account registration was useful to enlist the application user candidates. The login feature was useful for the registered users to access the other features of the application. The admin feature, for the coaches, was useful to add the athletes, edit the athletes, see the list of the athletes, screen the athletes, check the biodata of the athletes, check the program of the athletes, input the test and training results, and display the test and training results. The training program feature consisted of training program input and a coach-biodata edit menu. The last feature was - the log-out feature to allow the users to log out from the application.

Validating the Plan

The researchers validated the product by involving the experts. The researchers used the evaluation sheet with some aspects, such as product quality. Then, the researchers also provided sheets for validators to share their suggestions for further revision and development.

The researchers also directly observed the small-scale test and noted the implementation.

After that, the researchers reflected on the implementation of the developed product during the small-scale test.

The researchers interviewed the athletes and the coaches during the small-scale test about the developed product. The researchers asked about the convenience, safety, and functionality of the developed product. The interview results were useful to complement the observation results.

In the last stage of this validation, the researchers did member-checking to guarantee the data validity. This member-checking process made the researchers able to evaluate the implementation of the developed product. The results of the process were useful for the researchers to create a summary. This summary was useful to revise the product. In this process, the researchers did the checking process with the data analyses and conclusions.

The results of evaluation sheets or the questionnaires from every expert obtained a score higher than 95.5. This score was categorized as "excellent or accurate."

Revising the Design

The experts' judgment of the developed application, Latidan 21, showed an excellent category without any suggestions or revisions. Thus, the developed product, Latidan 21, could be tested in the field with a small-scale test.

Product Trial Run

The researchers tested the product by involving 5 coaches from the Training Center of Learner Athletes in Jepara. The test was useful to determine and identify the shortcomings, the limitations, the strength, and the effectiveness of the product. After using the application, the researchers interviewed the coaches to determine the shortcomings, the limitations, the strength, and the effectiveness of the products based on the coaches' perceptions.

The interview result data were useful to evaluate the product before being massively tested. The interview results with the coaches showed the application was accepted. Here are the results of the small-scale test.

- 1)The product was applicable for training endurance.
- 2)The product was safe to use.
- 3)The product was convenient to use.
- 4)The product facilitated the coaches in arranging the training program.

After being tested, the researchers discussed the product's reliability and effectiveness while being used by the athletes. After checking the data via discussion with the IT and training program experts, the product was deemed reliable and effective to use. Thus, the product could be

tested on a small scale and broader scale.

After testing the product in a small-scale test, the researchers conducted the broader scale test. However, before testing the product in a broader scale test, the researchers rechecked the products based on the suggestions, recommendations, and comments.

The First Product Revision

From the small-scale test with the coaches, the product, Latidan 21, was excellent without any suggestions and revisions from the experts. Thus, the developed product, Latidan 21, could be tested in the field with a small-scale test.

The Large Scale Test

The small-scale test and broader-scale test involved all athletes under the supervision of the Department of Education, Youth, and Sport. In this stage, the researchers analyzed the data descriptively and analytically. Then, the researchers reviewed the information and the feedback from the subjects. The researchers did member-checking with the experts as a triangulation effort.

Then, the researchers used the indicators, such as 1) the product could facilitate, encourage, and control the training based on the developed program of the coaches. The member-checking results showed that:

- 1)The product was applicable for training endurance.
- 2)The product was safe to use.
- 3)The product was convenient to use.
- 4)The product facilitated the coaches in arranging the training program.

From the results, the developed product, Latidan 21, was ready to use. The evidence of this readiness was the product could meet the successful indicators.

Final Product Revision

The final product was the Latidan 21 application. This application could encourage the researchers to create an endurance training program. The product was successful to meet the indicators of successful products, such as analyses of the observation, interview, and discussion with the experts, the coaches; and the documentation of all subjects that used the product.

Sport achievement development is inseparable from the science and technology of sport. The support of science and technology in sports could influence the achievements of the athletes. The use of science and technology may be varied and complex, for example, to facilitate the coaches in designing the training method, facilitating the athletes to promote physical exercise both autonomously and in a group. The expression states that science and technology greatly influence the advanced achievements of national sports athle-

tes.

The trial run test result showed the product could support the training program implementation. The results were consistent with the interview results.

- 1) The developed application, Latidan 21, is easy to apply by the coaches of the Training Center of Learner Athletes as the media to design a training program.
- 2) The application could facilitate the coaches to develop the individual training program.
- 3) The application was useful for the coaches to make a training program.
- 4) The application was convenient, safe, and standard for the participants.
- 5) The application was convenient, safe, and standard for the participants.
- 6) The IT and training program experts, all sports coaches, and supporters of the training stated the developed application was safe, convenient, and standard.

Ninghardjanti, Huda, and Dirgatama (2022) explain that the standard to do from the beginning of the application development determines the establishment of the information. Thus, programmers should understand how to instruct and manipulate the data in the database server and the required hardware. Some consideration points include:

- 1) The long-term necessity,
- 2) The data safety, password ownership, access grant to configure safely,
- 3) The hardware necessity from various existing resources,
- 4) The adequate skills to transact based on the program needs,
- 5) The compatibility of the applied program language by the programmer,
- 6) The accessibility with the integrated excellent database management tools or tools in the market,
- 7) The maintenance facility by information technology staff,
- 8) The standard facility and backup-restore method
- 9) Price;
- 10) Other facilities, such as synchronization, inter-server replication, publication, non-specific hardware reliance, etc
- 11) The capability to be developed based on the needs, such as business, intelligence, and Dataware housing

The developed product was effective. The results were based on the interview results.

- 1) The application was applicable as facilitation media for the coaches to make a training program.
- 2) The application was the product develop-

ment to facilitate and ease the athletes in promoting their training.

- 3) The application was applicable as facilitation media for the coaches to make a training program.

These results were consistent with Kauser Sk and Anu V (2022). The researchers explain each android component has different functions. Then, one component to another is complementary to each other. One of the functions is services. This function serves the users to do various activities with the application.

The result was consistent with Irfan and Komaini (2019). The researchers produced the program to train the physical fitness of the learner athletes.

Some strong points of the product were:

- 1) Originality: the product was the creation of the researcher. Thus, the product was not available in Playstore. The training program application was more specific for every individual.
- 2) The strength of innovation aspect. This aspect has some strong points., such as innovative masterpiece, material, and ease of operation for anyone with any education level. The application facilitated the coaches to design a training program for every individual and develop the training program and facilitate the athletes to promote and report the training results.
- 3) The strength of the economic aspect. The price was economic, affordable, and useful for most people to support the development of the sport nationally. The application applied to all people, not only within the sports field.
- 4) The aspects of convenience and security included the security and convenience for the athletes in saving the data. The data were more complete than the conventional procedure.

The developed product also had some shortcomings. They were:

- 1) The product was limited only to Android-based smartphone devices.
- 2) The product was limited to a common material of endurance training.
- 3) The research, during the small-scale test, should have been done in a long time to determine the effectiveness of the product.

CONCLUSION

From the research results, the researchers produced a product named Latidan 21. The product was applicable and effective to facilitate the coaches and athletes of the Training Center of Learner Athletes in Jepara.

The product development model, Latidan 21 application, was useful as an alternative to

support the sports achievements, especially the realization of endurance program implementation on the athletes of Training Center of Learner Athletes in Jepara.

The coaches suggested the researchers use the android application to facilitate the coaches in creating an endurance training program for the athletes in a specific manner. The application made the coaches not count manually the formula. The application allowed the coaches to determine the applicable exercise model. This application automatically provided the descriptions and the training model to apply with the distance and the time achieved by the athletes.

The researchers suggested the athletes of the Training Center of Learner Athletes in Jepara use the application. Thus, they could improve their endurance with the programmed and structured training model.

The researchers suggested the trainers and the management of the Training Center of Learner Athletes in Jepara use the product to develop the human resource. The product could facilitate the coaches to create an endurance training program and improve their performance.

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