Development of Stick and Ball Sports on Gateball

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Abstract

The purpose of this research is to make product design development of stick and ball sports in gateball. The approach used in this study is a method of Research and Development. The subject of this research is the Central Java on gateball club event gateball in Semarang and Yogyakarta. Experts and expert expert gateball expert in mechanical engineering. The data analysis phase the work field, and the data analysis stage include observation, observation, interviews, and documentation of the test kefektifan products, expert judgment expert expert gateball and expert mechanical engineering expert. The results of this research are stick and ball exercise for beginner players gateball gateball. The result of the validator 3 expert expert from the expert gateball and expert mechanical engineering product validation data beginning the first phase obtained a score above 73 definitions of the criteria of "good", on the second stage of the product validation data obtained a score above the 81 criteria for "excellent". The results of the interviews to the development of gateball players 19 stick and ball gateball can not be used to play in a match and can be used for subsequent exercises but for beginners a product development tool model stick and ball gateball " INC. "can be used to enhance the ability of basic techniques in motion game for players, gateball.

How to Cite

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INTRODUCTION

The sport is any systematic activities to encourage, foster and develop the potential for physical, spiritual and social (Act No. 3 of the year 2005). The scope of the exercise according to the system of National Keolahargaan Indonesia consists of sports education, sports, recreation and sports achievements. Recreational sport is a sport which is performed with a penchant for community and ability to grow and develop in accordance with the conditions and cultural values of the local community for health, fitness, and fun. Recreation of the latin "re-creare", which literally means "reset", is an activity that is performed to return physical and spiritual refreshment. This is an activity that is done the sport whilst working. Activities are generally done for recreation is tourism, sports, games, and hobbies. Recreational sports can also be used as a vehicle of leisure education can provide experience for the child and can shape personality in order to build confidence and improve our ability to know yourself and others.

According to Col gateball is a kind of sport that is unique, as it is played simultaneously between recreational purposes while grabbing feat. Gateball players do not distinguish gender, age (old-young, male, female), this sport is a sport safe, does not require excessive power, no physical contact, as well as a rolling ball above ground level. Gateball is a sport that uses the beater (stick), played by two teams face each other. Each team consists of 5 players, with 5 balls. The first team with a red ball, each ball is numbered 1, 3, 5, 7, and 9. While the second team with white balls numbered 2, 4, 6, 8, and 10. Each player each have 1 ball. Gateball is played in the open field or grassy field was covered with artificial turf, there are no obstacles (trash, stones, etc.), flat square length with size 15 x 20 m or 20 x 25 m (commonly used 15 x 20 m). The uniqueness of sport Gateball is unnecessary physical toughness biasauntuk become players. Age factor is also not snag create playing gateball on national and international events. Thus, gateball is often referred to as a sport without limits.

Gateball sports entered in Semarang areas beginning in 2012 that was introduced to employees of Large Hall area of the river Pemali. Until now in the Hall of the River Pemali Juana has two clubs. Once introduced in a large Hall area of the river Pemali Juana recently spread in Dinasservice area of Semarang, gateball Club which has around the Office of the province of Central Java.

Preliminary results of a study it conducted on February 12, 2017 at the service of the Central Java province PSDA, Mina Clan in Central Java, the Balai Besar area of the river Pemali Juana, PLN Central Java province, Copyright works of Central Java province, Department of youth and Sports Central Java, Bina Marga (Teak Coral Equipment Units), SD N Wells Banyumanik Boto. Obtained results that according to the opinions of the various clubs, Gateball can not develop to its full potential, one of the reasons is the high stick, produced by Japan gateball and balls, the difficulty of getting the gear stick and ball gateball, even though the stick and the ball is the main equipment in the game of gateball. Stick, produced by Japan's existing excess with a stick made by machinery manufacturers so that the result is nice but there are drawbacks, namely the price is expensive and difficult in Indonesia because it had to Import directly from Japan. On the basis of the background mentioned above, then the researchers intend to develop a form of tool stick and ball gateball with title of research in the form of "development of stick and ball sports on gateball".

Development of gateball constraints experienced in Semarang, so have not been able to develop in the society to the maximum, as well as other sports such as soccer, basketball, volleyball, badminton, and others. Whereas gateball already applied to the international arena. (Attaqi, 2016) Indonesia has great potential to become a Hockey stick manufacturer. Indonesia has abundant wood and good quality and skilled human resources, sophisticated and modern wood processing machines are also owned by timber companies in Indonesia. But in reality Indonesia is still dependent on Hockey import stick. If Indonesia continues to rely on other countries' products, it is clear that the achievements and sports industry in Indonesia will not be able to move forward. Problems that can be identified is an expensive tool, tools that are difficult to get, a long bureaucracy to get tools, a new sport, a sport that has not been popular.

A research certainly has problems that need to be researched, analyzed, and kept to a possible solution. In this research the problems that need to be formulated is how product design development of stick and ball sports in gateball. Aiming to make product design development of stick and ball sports on gateball produced by Japan.

METHODS

The research design used in this research is research development (research and development). According to (Sugiyono, 2010) research methods development research is a method used to produce a particular product, and to assess the effectiveness of these products. Another case, to produce a specific product is required and needs analysis to test the effectiveness of these products.

In research and development is focused to produce a tool of stick and ball gateball for athletes beginner. Measures development in the study of appropriate measures of research development of Research and Development (R&D) in **picture 1**.
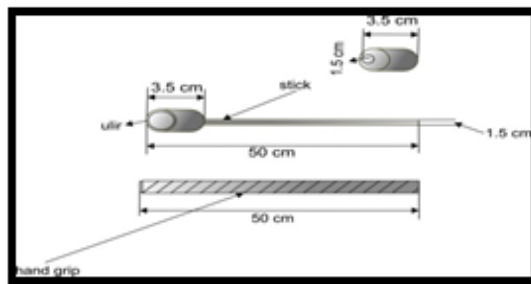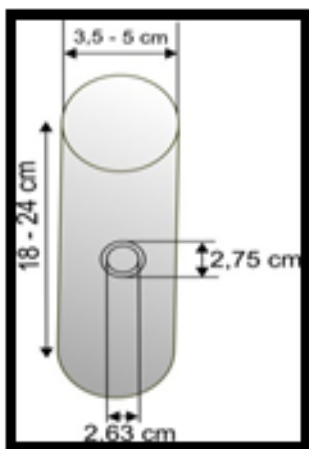

Picture 1. Measures the use of methods of Research and Development (R&D).Source: (Borg and Gall in sogiyono's book)
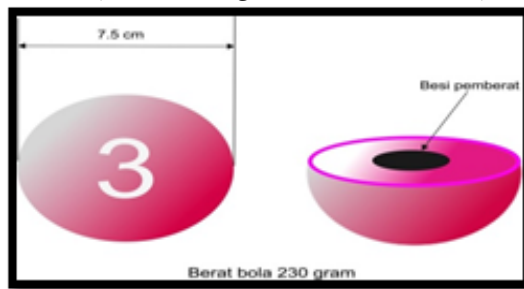
The subject of small-scale trials I & II implemented in Semarang city with 8 players gateball. And large scale trials in the city of Yogyakarta, with 19 players gateball.

This development in the study, researchers used the experts expert review the material and mechanical experts to observe and measure the quality of products (kevalidan, practicality, and effectiveness) products are made.

Design of products made in the development of stick and ball gateball are as follows:

Picture 2. head and body stick
Source : (documenting the researcher, 2017)

Picture 3. gateball ball
Source: (documenting the researcher, 2017)

Engineering data collection done in research development, as follows: observation, interview and documentation of data analysis techniques used are descriptive use percentage to know the validity of product experts and response receivable expert/experts and players against products stick and ball gateball through question form provided by researchers. While the data in the form of advice and reason of choosing the answers are analyzed using qualitative analysis techniques. The formula used in the percentage of data processing are as follows:

$$P = \frac{\sum Xi}{\sum Xi} \times 100\%$$

Description
P   = Presentage
$\sum Xi$ = The amount of Score study by coach or Athlete
$\sum Xj$ = The Amount Of The Maximum Score
100 % = Konstanta

From the results of the percentage obtained is then classified to derive the conclusion of data, in table 1 will be presented the classification of percentage

Table 1. The Classification Of The Percentage

Percentage	Classification	Meaning
75 – 100 %	Very Good	Very Decent Used

50 – 75 %	Good	Feasibility
25 – 50 %	Less Good	Fixed
0 – 25 %	Not Good	Not Worth To Use

Source : (Sugiyono, 2016)

RESULTS AND DISCUSSION

Small-scale Trials I & II

After the product development of stick and ball gateball treated small-scale trials I & II and revised and discussed with experts and expert engineers gateball product development model stick and ball gateball ready to do a test scale small II in gateball players.

The following is a breakdown of the number of players gateball (respondent) used in small-scale trials II:

Table 2. List Of Small Scale Trials Of Gateball

Name	Age	Team
Apriyandi Idris	28	Pen
Purbo rokhman	31	Pen
Sugeng priyono	45	Pen
Mada ikrar S	35	Pen
Bayu Edhi C. S.	30	Pen
Budhi Santoso	41	Pen
Yoyok Haryo	50	Pen
Sri Wahyuningsih	49	Pen

This test aims to find out and identify the various weaknesses, deficiencies, excess, and the effectiveness of the product when used by players of gateball. The photo attached to the attachment.

Data obtained from the results of interviews conducted by researchers to the respondents or subjects of a test used to evaluate a product before it is used in a tested wide scale usage. The **table 3** details the results of the interviews have been done researchers in small-scale trials II against gateball players is as follows.

By looking at the **table 3**, then the results obtained by researchers in a small scale test II is as follows:

1. The product is safe to use for gateball players exercise
2. Products already comfortably used for gateball players exercise
3. The product is in compliance with the physical size of gateball players
4. The product still used for gateball players exercise
5. The product can not be used to play
6. The product can not be used for the next exercise

For complete data and as part of a triangulation carried out discussions with experts experts gateball. After the test run finishes placing experts discussion experts to assess whether the development of the product stick and ball and gateball are effective when used by players of gateball.

After the inspection data with through discussion with 3 people and 1 gateball expert expert expert expert mechanical engineering, then obtained the results that the product development model stick and ball and gateball are effective when used for players gateball in small trials I headed to small scale II and can proceed to test your usage (broad-scale trials). After small-scale trials I towards small-scale II and prior to the implementation of the broad-scale trials, much needed feedback, suggestions and comments on the development model of stick and ball gateball.

Table 3. The results of the interview against the players in gateball small-scale trials

Substance	The results of the interviews the cast of gateball								Result
	1	2	3	4	5	6	7	9	
Security	√	√	√	√	√	√	√	√	Secure products
comfort	√	√	√	√	√	√	√	√	Cozy products
Size	√	√	√	√	√	√	√	√	The size corresponds to the size of the physical
A load of stick and ball	_	_	_	_	_	_	_	_	The weight of unresolved
Uses to play	_	_	_	_	_	_	_	_	The product can not be used to play
Uses for the next exercise	_	√	_	_	√	_	_	_	The product can not be used in the next exercise

Product Revision After Tests Small Scale II

Based on advice from experts of the expert on the development model of tool stick and ball of gateball which has tested cobakan in scale, then the focus of researchers to prepare product development to prepare to test the use (test wide scale).

Wide scale Trials

Wide scale trials conducted in the field of Shiva of Prambanan, Yogyakarta. The number of athletes that used in a trial of a wide scale is 3 club. (Picture attached documentation) the following is a breakdown of the number of players gateball (respondent) used in wide scale test:

Table 4. List of gateball wide scale trials

Athlete Name	Age	Team
Apriyandi Idris	28	Pen
Purbo rokhman	31	Pen
Sugeng priyono	45	Pen
Mada ikrar S	35	Pen
Bayu Edhi C. S.	30	Pen
Sugeng Santoso	48	Pen
Ali Sodiqin	21	Retto
Astriana Yasika Maida	22	Retto
Dandy Prastyanto	24	Bengawan Solo
Deni Purwani	24	Retto
Muhsin Catur	24	Retto
Fathurahman	38	Borobudur
Sukar	40	Borobudur
Aryanto	41	Borobudur
Masrufan F	38	Borobudur
Anton S	40	Borobudur
Adi Panuwun	37	Borobudur
Rafael Warsidi	39	Borobudur
Bayu Kristiaji	45	Borobudur

At this stage of the analysis of the trial data, this wide scale data observations, interviews and documentation analyzed in analytical diskriptif by doing pencermatan and in-depth examination of the information and or feedback that can be dijaring from the test subjects try. To selengkapi data and as part of a triangulation carried out discussions with experts experts gateball. Indicator to determine whether the results of the development of the product stick and ball gateball is in compliance with the purpose of the
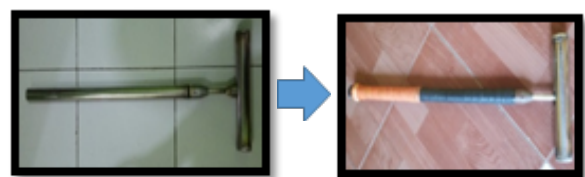
research was to the way athletes do short punches and blows away with using the product development of stick and ball gateball the observer (researcher and expert scholars) doing observations and pencermatan. As well as collecting the results of the interview against the respondents (subject tests). The table details the results of the interview that has channeled researcher in wide scale trials against players gateball.

From **table 4.** then results obtained by researchers in the wide scale trials are as follows:

1. The product is safe to use for gateball players exercise
2. Products already comfortably used for gateball players exercise
3. The product is in compliance with the physical size of gateball players
4. The product still heavy when used for gateball players exercise
5. The product can be used to play
6. The product can not be used for the next exercise

After completing the data and as part of a triangulation carried out discussions with experts/expert team validator and a gateball players also be respondents at large scale trials/area. Discussions do give some questions that aims to see the extent of the feasibility of the development that has been done. Summary of trial results testing/usage wide scale i.e. products in both the criteria and the product is said to be worthy of use for beginner players.

Comparison of initial and final products can be seen in the following **table 5**:

Picture 5. Initial products and end products

Table 5. product comparisons early and final product

Early product	The end product
Grip stick still in a State of open without a grip that wraps.	Grip stick already bundled in with a neat denghan grip using the basic rackets.

The end of the handle still open without any cap on the handle grip dipunggung.	The end of the handle of the stick already covered by using a pedestal table that is made of rubber.
The color stick still naturan with metal scrap welding	The color stick is already diamplas and already cleared from the former las.
The length of the stick 50 cm	same
Diameter of stick 4.47 cm	3.9 cm in diameter
The weight of the head of the stick 600 grams	Weight 400 grams
The weight of the ball 300 grams	Same

Product specifications development of Stick and Ball Gateball. Development of gateball ball and stick model has specifications:

1. The head of the Stick gateball has a length of 20 cm
2. The Diameter of the head stick 3.9 cm
3. The length of the rod stick 50 cm
4. Material stick stainless
5. natural Color stick
6. The weight of the ball 300 grams
7. ball Diamater 7.4 cm
8. The color of the ball that is already a patent that is red and white.

By looking at the comparison chart between the stick and the local stick then import can be drawn the following conclusions:

Aspects of Orisinilitas

Product development model stick and ball gateball is a result of researchers with distinguishing features compared to existing sports technology, so it is the tangible results of ideas, thoughts, concepts of invalid constructs which belonged to researchers with intent and purpose is as a business as well as its efforts in helping to increase achievement and develop the sport of gateball.

Aspects of Innovation Excellence

Product development model stick and ball have in the work of innovative gateball, materials, use and maintenance. By looking at the ingredients used in the manufacture of using only local ingredients.

Economic Aspects

Product development of stick and ball gateball have economical and affordable and have a high effectiveness for a broad audience in favor of sports coaching gateball. By looking at the price that must be removed if we see a product stick import costs Rp. 700,000.00 USD 1,000,000.00 >-and the price of imported ball costing Rp > 600,000.00. Product development with a stick and a ball of gateball for Rp. 400,000.00 to stick and IDR 250,000.00 for the ball. It also could provide jobs and empower local communities in making product development of stick and ball gateball.

The aspect of comfort and security

Product development of stick and ball gateball have safety and comfort level is good for players gateball. Evidenced by the stick adjustable short length according to the size of the physical Jock gateball stick without feeling and mind.

To facilitate us in looking at the effectiveness, advantages or weaknesses between the product stick gateball import compared to product development stick gateball. You can see the **table 6** as follows:

Table 6. table product development effectiveness of stick and ball gateball

Product import	Local Product	Result
Stick and ball made of gateball import	The ingredients stick and balls made local gateball dri local ingredients	The product has the edge on the orisinilitas
Price from Rp import gateball stick. 700,000.00 USD 1,000,000.00 >-and priced the ball imports reached Rp. 700,000.00.	The price of the local Rp gateball stick 400,000.00 and local Rp 250,000.00 ball.	The product stick and ball have the advantage of local Economical gateball.
Making use of machine technology	The manufacturing process by means of empowering communities (the welder)	Product development of stick and ball Orisinilitas aspects have the advantage of gateball and Economics

The weight of the head of the stick: 500 g	The weight of the balls stick: 400 g	The product has an innovative excellence aspect
Long head stick: 18-24 cm	Long head stick: 20 cm	
The surface of the stick: 3.5-5 cm	The surface of the stick: 4.47 cm	
Length: 50 cm stick rods	Length: 50 cm stick rods	
Ball weight: 230 g	Ball weight: 300 g	
Ball diameter: 7.5 cm	Ball diameter: 7.4 cm	
Color in accordance with the terms of the factories	Colors can be customized with a desire	The product has the advantage of innovative

CONCLUSION

After going through the process of model development tools through a stage which is a modification of the Brog and Gall then researchers produce a product development tool models are stick and ball gateball named "Inc. (Indri Colection)". Based on the results of the discussion in this research it can be concluded that: 1). product development model stick and ball gateball "INC." can be used as a means of practicing the blow for the player, 2 gateball). product model development tool stick and ball gateball "INC." can be used to enhance the ability of basic techniques in motion game for the players of gateball, 3).Product development model stick and ball gateball "Inc." can be used to play a game of gateball players.

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