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The Development of Biometric Sensors to Net Sports Volleyball

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Abstract

The objective of this research is to design biometric sensor designs for the net of volleyball to detect failures occurring on the net. The approach used in this research is Research and Development (R & D) method. Research subjects were athletes and volleyball referees. Expert volleyball volleyball results one is better with the total score of 85, the validation of the volleyball of two is good with the number of score 87, for the electro expert one expressed well with the total score of 86, the two electro experts stated both with the number of scores 88. The conclusion of this study Produces a net biometric sensor product for the net of volleyball in 2017 in a volley ball beast worthy of use in a volleyball match, for athletes referees and coaches may recommend trying as a means of detecting errors occurring on the net of the volleyball.

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INTRODUCTION

Athletics for elementary school different from Sports achievements accomplished through the process of coaching and development programmatically, tiered and sustainable, with the support of science and technology keolahragaan. This is in line with the opinion of the Adang Suherman "sports achievements are sports that nurture and develop the sportsman programmatically and sustainable through the competition to reach the achievements with the support of science and technology (Science and Technology) ". (Act of the Republic of Indonesia Number 3 Year 2005 About National Keolahragaan System. 2007.)

Boal volleyball as the industry that must be supported by adequate infrastructure and one of the referees must be right in deciding the offence in the match. Volleyball game presided over by a referee, the referee is an important part of a game. Referees who are not usually good quality is often a problem that invited protests for a player, a coach, nor the audience could trigger riots.

In a match of volleyball that has already led to systems of digital technology, for example in digital scoresheet volleyball that serves to display the results of the matches, the turnover of players, determine the libero, connected to a central server to report print out. In this modern era needed a tool supporting the game of volleyball.

Based on the findings of field researchers surveying directly into referee-referee in Central Java region especially in Kabupaen stem. Based on the interviews to the referee about leading a game of volleyball. It turns out in a match of volleyball referees requires high concentration, because every game should lead to good terms at the time the ball takes place it is expected the referee did nothing wrong. In the main it is a-class players nationwide, automated boalnya fast that requires high concentration. At the time of the match referee's task was not as heavy as any field umpire their games should be run with the hot weather or rain. Constraints when officiating usually when fastballs in front of the net. To overcome such barriers may be the creation of tools for the referee in front of the net.

Based on consideration of the author's wish to develop a model design tool which gives ease for the referee, in taking decisions when it comes to the net. This tool was developed in the form of biometric sensors to net sports volleyball comes a warning alarm and warning lights. According to the opinion of the referee for this tool used in the game of volleyball is still using manual compliance PBVSI i.e. using the net in General. While the sensors to the pre-existing but has not been used during the game Area, national, and international level. The expectation that later with the presence of the biometric sensor development products for net sports volleyball, the net can be grown in all regions of Central Java and the surrounding area.

The sensor is a detector that has the ability to measure some kind of physical quality that occur, such as pressure or light. The sensor will then be able to convert the measurement into a signal that someone will be able to read. Most sensors can be used when this is really going to be able to communicate with electronic devices that will do the measuring and recording. (Sam Rafiuddin, 2013). A product is anything that can be offered go to market to get attention, purchased, used or consumed that can satisfy the desires or needs. Product quality is the hallmark of the whole as well as of one product or service on its ability to satisfy the needs expressed. (kotler dan Amstrong 2001).

Formulation of the problem is how the development of biometric sensors to net sports volleyball year 2017.

The purpose of this research development produce a biometric sensor development for net sports volleyball year 2017..

METHODS

The design of the penilitian used is using the model-based development research (research-based Development). According to Sugiyono (2010) model of research and development (research and Development) is research used to produce a particular product and test the effectiveness of these products.

The subject of the test classifies into two test subjects are as (1) an expert volleyball experts mean in question was a volleyball referee role to determine whether the biometric sensors to net sports volleyball is already appropriate material and the truth. (2) electrical electrical expert expert on research is a Lecturer/expert in terms of addressing the usual electro. Validation is done using the now about the design and effectiveness of biometric tools series tools. Product tests in the subjects of the research are 12 athletes and 2 referee program Porma in FIK UNNES, whereas in a free trial of the use of the research is the 12 athletes and 11 referees in matches Pom Rayon I Jateng. The design of biometric sensor development products for the volleyball net developed by researchers is product specification. Pproduct

designed to help alleviate the performance of the referee. The basic ingredients of products made of the electrical components are cheap and there are plenty of electrical at market. On the net it is a tool that was developed is indeed being a solution, but the sensor cannot be obstructed by an object such as a shirt.

How this research data analysis using qualitative approaches and methods of model development.

The draft design:

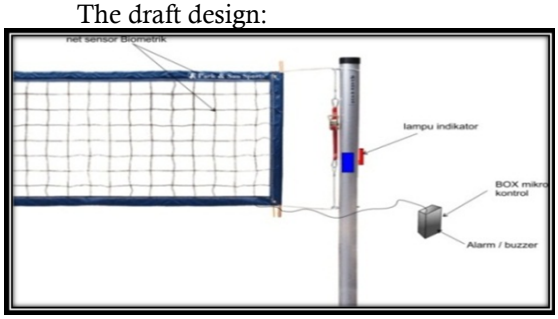

Image design of products: net the top white band lined with aluminium foil as a conductor kesensor. For the light is placed on the net to overlook the referee two will be transmitted to an electronic circuit through cables and Sockets. For micro box controls that are in his or her electronic circuits contain alarm or buzzer and placed on the table scorer.

The way it works at the moment there is a touch of the hand of the flow sensor voltage of about 0.5 mV to 1 mV later reinforced by an op-amp amplified 1000 times strengthening so that it becomes a voltage that is able to drive the relay so that the relay could trigger turn the strobe lights and buzzer, so the referee can figure out which team touched the net.

RESULTS AND DISCUSSION

Small scale trial aims to find out and identify various problems such as weakness, deficiencies, or effectiveness of the product when used by players. Data obtained from this test is used as the basis for performing the revision of the product before use on field trials. Data obtained from filling the questionnaires by the experts is the initial data to state whether the biometric sensors product net worth used and effective use of volleyball matches. 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 1** details the results of the inter-

Table 1. Details the results of the interviews

Substances	The results of the interview the volleyball player						Conclusion
	1	2	3	4	5	6	
Security	V	V	V	V	V	V	The product is safe
Usability	V	V	V	V	V	V	Comfortable products
Measure	V	V	V	V	V	V	The size corresponds to the size of the White Ribbon.
Sound	-	-	V	-	-	-	A little disturbing the concentration of players
Comfort to match	V	-	V	-	-	V	The product can't be used a means in the match
The next match for usability	-	-	V	-	V	V	The product can't be used in the next match

views have been done researchers in small-scale trials II volleyball player is as follows:

By looking at the **table 1** above, then the results obtained by researchers in small-scale trials are as follows, As many as six players of volleyball stated:

1. The product is safe to use in volleyball match
2. Comfortable products already used for volleyball matches
3. The product is in compliance with the White Ribbon size
4. The product is a little annoying when the game of volleyball players
5. The product can not be used for means of volleyball matches.

Free trial of wide scale trials widely conducted at Gor UIN information in the POM RAYON 1 Jateng. The number of athletes and referees are used in wide-scale trials were 12 athletes and referees from several regions in Central Java

Table 2. Wide-scale trial

Substances	The results of the interview the volleyball player						Conclusion
	1	2	3	4	5	6	
Security	V	V	V	V	V	V	The product is safe
Usability	V	V	V	V	V	V	Comfortable products
Measure	V	V	V	V	V	V	The size corresponds to the size of the White Ribbon
Sound	V	V	-	-	V	V	A little disturbing the concentration of players
Comfort to match	V	V	-	V	V	V	The product can not be used a means in the match
The next match for usability	-	V	V	V	V	-	The product can not be used in the next match

Based on the analysis of the results of research and discussion in this thesis, then do some revision include :

Net product changes on the development of biometric sensors to net sports volleyball originally regular net in General and in the modifications into the biometric sensor net to net sports volleyball.

1. The White Ribbon Changes the top of net in aluminum foil your, 2. The Sound is still pretty much the same, 3. At the time of the match does not interfere with the referee. Research Development made by share stages. The research starts from the initial product validation tests of the product i.e. small-scale trials and scale great that produced bulk products where the product can be used kebermanfaatannya, researcher involves 4 validator with the expertise of each i.e. electrical expert and expert material consisting of national volleyball referees. The tests are performed in a scale kesil Porma FIK UNNES and large scale trials are conducted in a Pom Rayon I Central Java. Product validation is performed using instruments in the form of the now know the extent to which these tools are said to be worth to tested. Kuesoner/question form used in the research process as data validation and test the effectiveness of products. At the same time do some checking, such as documentation, interviews and discussions on more than one source in the same way i.e. observation and expert on experts. For assessment using the assessment have been developed application of science and technology sport, Deputy Minister of youth and sports of the Republic of Indonesia in 2011. The results of the expert assessment expert volleyball one with a score of 85, two volleyball experts with a score of 87, expert electrical expert one by a score of 86, two electrical experts with a score of 88, the results of the evaluation by the respective experts obtained a score above 85 that goes criteria good and proper.

Research results based on the analysis of the trial data, description of implementation in the trunk and Semarang to tiredness the tool how far this tool could diguanakan in a match, free trial of effectiveness, observation techniques (observation), interview, documentation and discussion. A description of the results of the selection of products, researchers developed a biometric

sensor net development products, and based on a needs analysis and specifications owned on the net. The initial draft description, in the making of the initial design, the researcher operates on the criteria that have been used by kemenpora in the selection and research for innovative technology works competition participant sports in the year 2011. IE: aspects of Orisinilitas, the innovative aspect of the benefit Aspects, economic aspects, security aspects, aspects of Comfort.

The initial product was designed aiming used to practice volleyball player, about the toughness of this tool as seen from accuracy, tension, if exposed to the armor can sound or not. Mechanical tests, speed of reaction or response from the tool, the tool ball conflict can stand what do not. For a free trial of the weather, the extent to which the tool if it is exposed to wind or rain, whether it could survive for long. When the sensors used can cause problems for an audience or not. The possibility for error diet, lights and the sound is not turned on. Just note the referees one and two. How to uninstall install tool, takes how long. Heat and water resistant for how long. The possibility of system error.

Validation of the product early, before the tested biometric sensor development for the sport of volleyball net in advance need validation by the appropriate experts with specialist research field. The validation is done by means of a team of experts to observe the biometric sensor product is accompanied by the evaluation sheet along with pieces of suggestions and input.

Data validation, data obtained from the evaluation sheets or kuesoner charging by expert expert. The results of the expert assessment expert volleyball one with a score of 85, two volleyball experts with a score of 87, expert electrical expert one by a score of 86, two electrical experts with a score of 88, the results of the evaluation by the respective experts obtained a score above 85 that goes criteria good and proper.

The initial draft of the revision of a product, based on the advice of the expert's expert on the development of biometric sensors to net sports volleyball year 2017 then carried out a revision of the product **tabel 3**.

Table 3. Revision of the product

The Revised Section	The Reason The Revised	Repair advice
Sound too loud	Interfere with the concentration of the players	So that sounds just the referee
Hook lights to pillars	Since each different diameter pole	Replaceable wear rope krek.
Nylon on the net given the thin cable between team A and team B	Too complicated in installations, takes a long time	We recommend that you just dihilangi
Colour light yellow	Less glowing moments in the pool	Replaced the colors brighter

Effective product development of biometric sensor failure detection diet is based on the results of tests on a large scale. Effective products in question include the effectiveness of the use of the time, the effectiveness of the performance of the referee, and the effectiveness of automated products.

At the time of the discussion to implement biometric sensor development for the sport of volleyball net that already are considered final, researchers presenting expert expert. This activity aims to deliver development results (process procedures and products) to the users and the professional discussion to find out the extent to which research success is achieved. From the results obtained by researchers in field interview that the referee declares the tool is very helpful to the referee about the officiating in the match turns out volleyball volleyball referee requires high concentration and the constraints which often happens by the referee when the ball-the ball quickly in front of the net, to overcome the barriers may be created if there are tools that can help referees in a game. Presiding umpire stated a tool that researchers make it very helpful to referees Moreover, when the concentration is reduced or when the referee did not see the occurred error when on the net.

From the results obtained by researchers when the documentation is the real test, the tool is already working with a either a flame and lights as a warning sign when the player touches the net, but after the researchers observed when running game referee each has a duty which should be the referee was watching this tool but referee focus with tugasnnya let alone when the player is in front of the net and jellies should focus the referee saw it, so these tools there is no scrutiny of the referee at all. As for the cue in the regulations volleyball referee must be memorized and can be implemented in accordance with the existing errors in field. This gesture is performed only once, done by hand signals to designate one kesalaan

who did a turn, pointing to the designated service while giving the sign points from mistakes made one squad.

From the results obtained from expert kuesoner expert in electronics and ball volialat this is already good, and athletes when performing tests of athletes stated that the tool safely used at the time of the match, the athlete also feel comfortable when the tool is used the time of the match. Atletpun do not feel bothered the existence of such a device, but some athletes expressed the tool worthy of use in the match and claimed it has not been feasible to use in the game.

In this case the application tool that all referees declare the tool is already good and athletes declared safe and convenient tool is used when the match. But the results are more even inversely proportional, the tool has not been beneficial for the referee. Because it could not focus on the tool. The tool is also not to increase sportsmanship are high because a lot of constraints on when the match takes place and could cause unrest for the audience as well as a coach. Then it uses to facilitate the performance of the referee as observed many problem for referees itself, must change the rules of considered and many more about the tool. See the conclusions of these tools can not be used to help improve the performance of the referee. This tool also can not be used as a means for doing volley ball game.

CONCLUSION

Based on the results of analysis and discussion, then the conclusions that can be drawn from this research is produce net product using biometric sensors in refereeing volleyball is worthy to be used in the game of volleyball. To referee the athletes and coaches can recommend to try as a tool to detect errors that occur at the top of the net on a volley ball match. See the limitations of this product, in order to be further developed with the biometric sensor net product is to match the expected.

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