

Single Operator Application for Table Official on Basketball Game

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Abstract—Purpose of this study is to (1) design a single operator application for table officials in basketball, (2) Describe the workings it, and (3) Assess the extent to which single operator applications work for table officials in basketball. The method is the Research and Development (RnD) method. Instruments for collecting data using questionnaires, field notes and documentation. Data analysis using descriptive quantitative and qualitative approaches. The results of this study are product validation from basketball experts obtained a mean score of 4.82 with the criteria of "Very Good" and validation by electronics experts by 4.5 with the criteria of "Very Good". The final product effectiveness test on a small scale trial I was stated as "Very Good" with a percentage of 79.14% by the trainer and 83.33% by the table officials. While in the small scale test II stated "Very Good" with a percentage of 88.41% by the coach and 88.50% by the table officials. In a large scale trial the percentage of 90.87% obtained by the trainer and 89.04% by the table officials was declared "Very Good". The conclusion is single operator application for table officials that are feasible in basketball and deserve to be mass products.

Keywords—operator, aplication, basketball

I. INTRODUCTION

As one of the most popular sports in the world [1], basketball which is played by two teams and consists of five people each team [2], is a type of game that has a relatively fast tempo. This makes this sport not only competitive but also educating, entertaining and fun [3]. Basketball sports are a combination of defense and offensive techniques, therefore all players must master the basic skills and skills of basketball. Seeing the growing popularity of this sport, it was accompanied by an increase in championships and matches held [4]. The competition is no stranger to the NBA from the United States. While in the country there are various matches ranging from friendship matches, matches between schools, regional competitions, to national level such as the Indonesia Basket League (IBL).

With the increasing number of organizing basketball matches, it is expected that the championship can run effectively and efficiently [5]. Therefore, there needs to be support from various parties, including players, coaches, officials, organizers, referees and spectators [6]. One of the most important components is four table officials, consisting

of Match Inspectors, Timers, 8 'and 24' shootclock operators, and recording scores [7]. The table officials has an important role in basketball matches, because in it there are various kinds of recording events during the match. This recording is used to store the information needed [8], such as recording scores, time, and personal fouls.

But the problem that often occurs is the limited budget for organizing sports competitions including basketball. Even though basketball matches have a table officials who needs more than one person to carry out their duties, clearly that will make the budget big. A large budget makes the organization of the competition less efficient, because operational activities become efficient if the work can be achieved with the use of resources and funds as low as low [9]. This has made many basketball matches in the regions, especially between schools, only held perfunctory.

There is a need for innovations to overcome these problems in the digital era today, who made a digital application for score sheets in basketball matches, which were originally manually written into a score sheet digital [7]. This shows that technological progress if utilized properly will have a positive impact on the development of sports. Development of digital technology is increasingly rapid where everything leads to the use of electronics whose purpose is to facilitate humans in carrying out work [6]. In line with that sports technology must be applied skillfully so that it can continue to develop.

Based on the problems and theoretical studies above, researchers tried to innovate in making a single operator application for desk clerks in basketball matches. Product development applications that can help and simplify the performance of table officials in basketball matches, so that the organization of matches will be more effective and efficient. In addition, this research is also an actualization of the application of technology to the basketball sport.

II. METHOD

The design of this research is the development method. The development procedures used in developing single operator applications for table officials are as follows:

(1) Potential and Problem Formulation, (2) Data Collection, (3) Product Design, (4) Design Validation, (5) Design Revision, (6) Product Testing, (7) Product Revision, (8) Usage Tests, (9) Product Revision (10) Mass Products. The research data is used to develop products, and test the effectiveness of development products developed. The research subjects or respondents involved in this study were basketball coaches and table officials. Product testing through small scale I and II product testing stages was carried out on the basketball court of FIK UNNES with the subjects of 2 basketball coaches and 4 table officials. In a large scale test carried out in a friendly match between basketball clubs in Semarang. Instruments used to collect data, namely, questionnaires, field notes, and documentation.

Data obtained through trials are divided into two data, namely qualitative data and quantitative data. Qualitative data in the form of criticism, input and suggestions expressed by electronics experts and basketball experts coaches and referees for product improvement. The descriptive analysis technique uses descriptive statistics in the form of statements that are not good, lacking, sufficient, good, and very good with scoring 1 to 5.

The steps of data analysis used include: (1) Collect data, (2) Select data into categories, (3) Mapping the effectiveness of the product, (4) Perform synthetic processes, and (5) Making final conclusions.

TABLE I. PRODUCT EVALUATION CRITERIA

Score	Range of Values	Criteria
5	$X > 4,21$	Very Good
4	$3,40 < X \leq 4,21$	Good
3	$2,60 < X \leq 3,40$	Enough
2	$1,79 < X \leq 2,60$	Poorly
1	$X \leq 1,79$	Not Good

(Source : Suharyanto, 2007:52)

The product effectiveness test analysis technique is a percentage for analyzing and evaluating the level of effectiveness of product development using the formula:

$$P = \frac{\sum X_i}{\sum X_j} \times 100\%$$

Description : P = Percentage
 $\sum X_i$ = Total Assessment score by Coach and table officials
 $\sum X_j$ = Maximum score
 100 % = Constants

To make a decision to adopt criteria according to Sugiyono are as follows:

TABLE II. CLASSIFICATION OF PRODUCT EFFECTIVENESS

Value	Scoring scale %	Classification	Mean
1	0 – 25	Not Good	Not suitable for use
2	26 – 50	Poorly	Repaired
3	51 – 75	Good	Worthy of use
4	76 – 100	Very Good	Very worthy of use

(Source : Sugiyono, 2016:135)

III. RESULT AND DISCUSSION

The results of the research that have been done obtained the final product in the form of a single operator application that is effectively used by table officials and is suitable for use in basketball matches. This product is made at affordable prices. In addition, the products produced have automatic advantages through electronic circuits that greatly assist desk clerks in carrying out their duties in basketball matches. So that it will be more effective and efficient. The results of the validation of the quality of the initial product draft by the material expert have a mean of 3.92 stated "Good". Initial product validation by experts found the following input and suggestion revisions:

TABLE III. THE FIRST PHASE PRODUCT REVISION

No.	Revised Section	Reason Revised	Recommendation for Improvement
1.	Match identity	Does not appear in the layout	Add team name to layout

(Source: Research Data in, 2019)

The results of the second validation obtained a mean score of 4.25 stated "Very Good", while the validation stage by electronics experts obtained a score of 3.4 which was stated by the criteria "Good". The second product validation by experts found the following input and suggestion revisions:

TABLE IV. THE SECOND PHASE PRODUCT REVISION

No.	Revised Section	Reason Revised	Recommendation for Improvement
1.	Total time out	Not changed automatically	Automatic

(Source: Research Data in 2019)

TABLE V. SCALE 1 TRIALS

(Source: Research Data in 2019)

No.	Substance	Score	
		Basketball coach	Table officials
1	Originality	101	90
2	Excellence	132	143
3	Benefit	80	106
4	Economical	94	
5	Safety and comfort	83	138
6	Completeness	64	35
TOTAL			512
Max score	4 X 35 statement X 5 respondents (Coach)	700	600
	4 X 15 statement X 10 respondents (table officials)		
Percentage		79,14%	85,33%

(Source: Research Data in 2019)

Based on table 5 above, it was found that the basketball coach's response to the product was 79.15% with Very Good results while the desk clerk's response to the product was as much as 85, 33% with the Very Good criteria stated to be worthy of use. To complete the data and as part of data analysis, namely by examination and discussion by experts. Product validation data in the first stage product trial by experts is the product Validation results in the small scale I test by basketball coaches obtained a score of 4.2 with the criteria "Good" and by electronics experts obtained a score of 3.7 with the criteria "Good" . The revised notes, suggestions and input from experts in the small scale I test are as follows:

TABLE VI. REVISIONS, SUGGESTIONS AND EXPERT INPUT ON SMALL SCALE I TRIALS

No.	Revised Section	Reason Revised	Recommendation for Improvement
1.	Match identity	Less complete	Plus the origin of the player area
2.	Buzzer	Loud sound	To add volume

(Source: Research Data in 2019)

TABLE VII. SCALE 2 TRIALS

No.	Substance	Score	
		Basketball coach	Table officials
1	Originality	111	105
2	Excellence	154	142
3	Benefit	87	109
4	Economical	102	-
5	Safety and comfort	91	139
6	Completeness	75	36
TOTAL		619	531
Maxs score	4 X 35 statement X 5 respondents (Coach)	700	600
	4 X 15 statement X 14 respondents (table officials)		
Percentage		88,42%	88,50%

Based on the table described, it was found that the response of the basketball coach to the product was 88.42% with very good results while the table response to the product was 88.50% with the very good criteria stated to be very feasible to use. To complete the data and as part of data analysis, namely by examination and discussion by experts. Product validation data on the scale 2 product trial by the expert team is as follows: validation by basketball experts gets a score of 4.57 with the criteria of "Very Good" and by the electronics expert a score of 4.35 with the criteria "Very Good".The conclusion of the results of the second product trial is that the product is said to be feasible to be tested in a wide-scale use or trial. The following are input from athletic and electronics experts:

1. The match identity must be complete (name and origin of the region)
2. The timer must be automatic
3. The buzzer sound is hardened

TABLE VIII. LARGE SCALE TEST DATA

No.	Substance	Score	
		Basketball coach	Table officials
1	Originality	197	147
2	Excellence	303	205
3	Benefit	160	151
4	Economical	184	-
5	Safety and comfort	169	194
6	Completeness	132	51
TOTAL		1145	749
Maxs score	4 X 35 statement X 5 respondents (Coach)	1260	840
	4 X 15 statement X 14 respondents (table officials)		
Percentage		90,87%	89,04%

(Source: Research Data in 2019)

Based on the table above the results of the basketball coach's response to the product are obtained on a large scale according to the following:

1. Responding to the trainer with a result of 90.87% with Very Good stated to Worth being used
2. The response of the desk clerk to the product is 89.04% with the Excellent criteria approved for proper use.

To complete the data and as part of data analysis, namely by checking and discussion by experts. The product validation data in the large-scale trial by experts was as follows: Product validation by the 4.82 basketball expert was stated as "Very Good" by the electronics expert, a score of 4.5 was stated as "Very Good".

Based on the research development and testing steps as many as 3 small scale 1 tests, small scale 2 trials and large-scale trials have produced a final product consisting of a single

operator application for table officials in comparison to basketball.

The product victory indicator consists of analysis of observations, questionnaires, and discussions with a team of expert validators, namely electronic validators and basketball validators namely basketball coaches, and questionnaires for respondents in the trial guide of table officials involved. As per the product trials that have been conducted, the final results of developing a single operator application are very feasible to use by table officials in basketball matches and can be mass produced.

Product effectiveness the development of a single operator application for table officials at a basketball match was based on a large scale trial. Product effectiveness uses effective use of time, effectiveness of desk clerk performance, and the effectiveness of automatic product use.

IV. CONCLUSION

The conclusion in this research is:

1. The product development of a single operator application makes it easy for table officials.
2. Product development of single operator applications for table officials in basketball matches worthy of being used as mass products.

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