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Reliability of Futsal Skill Test for High School Players

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***Abstract*—some futsal championships have been held for high schools. FST can be used as a good test to judge the quality of futsal playing skill for high school players. Examining the reliability of the *Futsal Skill Test (FST)* for high school players is the aim of this research. The volunteers for this study are Forty eight futsal players from high school futsal teams. The players are required to pass, control, dribble, and shoot the ball as quickly as they can by the FST whilst making minimal mistakes. Two main trials were completed by the participants in one day. While using futsal balls, and following a standardized warm-up, all trials were performed inside a futsal court. By using Pearson's correlation coefficient, intraclass correlation coefficient and coefficient of variation between the repetitions of tests, the reliability of the tests was determined. Test-retest reliability statistics were as follows: time only; coefficient of correlation (r): .824, intraclass correlation coefficient (ICC): .901, coefficient of variation (CV): 3.80%, penalty time; r: .377, ICC: .531, CV: 21.30%, and total time; r: .736, ICC: .840, CV: 5.40%. In conclusion, the FST are reliable protocols to assess futsal skill in male high school players.**

***Keywords*—sport skills test, futsal, reliability**

I. INTRODUCTION

Futsal in principle is similar to other teamwork sports using balls such as soccer, basketball, handball, and hockey [1]. Cooperation among team members is employed by these sports in order to score a goal when they're in possession of the ball and to prevent the opposition from scoring a goal [2]. In futsal, the winner of a game is the team that earns more scores to the opponent's goal than to their own goal is the winner of the game in futsal. The nature of futsal is the beauty of the game, not the fact that it is to play. In terms of physics, techniques, tactics, and mentality, futsal is a challenging game. It is demanded of futsal players to play well and to be able to endure the pressures that come from physical fatigue and tough opponents with many immediate changes in game situations under the limited court and the limited size.

The average distance between each player and the physical dimension on the total distance gap is more similar to those of handball and basketball than to those of soccer [3]. Futsal might be viewed as a footwork game which is played with the hands or a handball game that is played with the feet. Acceleration and short-range sprint must be performed by an individual every 4 seconds in a futsal game according to Alcares et all. (2003) [4]. Playing soccer is slower than playing futsal. In terms of reactive agility and decision-making time, futsal players are significantly faster than soccer players [5]. Thereby, Futsal players are faster both in decision making and execution of playing techniques than soccer players are. Building skills, demanded fast movement (physic), demanded fast thinking (tactic), and demanded passing and goal scoring accuracy (technique) are the aims and requirements o Futsal.

Soccer and futsal cannot be separated. FIFA has standardized futsal as a five against five game [2]. A committee of futsal that will be focused on dealing with problems related to this sport has been established by FIFA; this committee is equal to the commissions of female soccer and beach soccer. The analysis of the European Cup competition held in 2004 showed the following results: Spain (pass 881/tackle 31), Portugal (1035/14), England (562/115), and Croatia (449/160)[6]. As shown by these results, in comparison to other countries like England and Croatia, countries that have good futsal teams such as Spain and Portugal have more ball possession with more passing and less tackling. The four countries have also attained different achievements with futsal. In some countries, futsal is used as a football development tool, to develop technical and tactical behaviors in young footballers [7]. Therefore, futsal becomes an integral element that might support soccer and becomes a part of soccer development.

In a game of futsal, ball possession is a priority for the competing teams. 100% ball possession should be the philosophy of every player who has a concept of futsal [8]. To score a goal in soccer, a team usually starts from ball possession, according to Lago-Penas and Dellal (2012) [9]. Controlling the ball, driving the ball, and shooting are the three techniques which are the most important in the game [10]. Marking the ball possession, moving toward the opponent's goal, and trying to score a goal are the three principles which make up attacking in futsal [11]. The goal-scoring efforts that have been display by the Portuguese futsal team started from the organization of ball possession (56.00%), counterattack (17.36%), and stopped ball (25.75%). The duration of ball possession, the involved players, the number of ball touches by the players, the number of passes and the number of shots are the indicators of a sequence of attacking in futsal [12]. Futsal skills range from being in possession of the ball to goal-scoring and they could be performed either by all the players in a team (ball possession) or by some players in a team (counterattack) and that might be performed through stopped-ball situations when a player is blocked by an opponent.

Futsal is a team sport. Team achievement is the manifestation of group-work, coordination and harmonization that has been supported by the standards of specific individual skills, just like the other branches in team sports. In order to win a game, a team has to be tactical. Both in part (several players in certain positions) and overall, game tactics demand teamwork. The expectation that each individual has a certain level of skills is the foundation of teamwork. Individual skills and pairing skills are the examples of these skills. Therefore, the individual quality of the players heavily determines the performance of a futsal team. It takes the performance of every player to support the performance of the futsal team since it is a team sport. Each player has There are minimum standards of performance which each player is expected to meet. Every futsal player should have futsal skills as an indicator of the player's quality. In order to win a game, these skills are very important.

Selecting and displaying appropriate techniques that are demanded by a situation in a game is what skills are all about [13]. The execution of skills and decision-making is a basis for evaluating skills [14]. Space, time, and playing technique assignments are the latent variables from tactical performance in team sports [15]. Time and place are considered while decisions are being made. The ability to find sufficient space and to use limited time in performing playing technique assignments is demanded of every player. Playing skills are a combination of playing technique and playing tactic execution. If players are able to execute their playing techniques based on the playing tactics that are demanded by the available yet limited time and space, they will have futsal playing skills.

Controlling, passing, moving with the ball, and shooting are involved in the execution of technical skills on attacking tactics for players who control the ball [14]. Other forms of executing skills for a player in receiving the ball, passing, dribbling, and shooting the ball to the goal are futsal playing skills. But these skills should be performed in a sequence as a depiction of ball possession within a futsal game instead of being executed separately. Ball possession always involves receiving, passing and dribbling and at the end of the sequence, the ball is shot to the opponent's goal. If players are able to execute receiving, passing, dribbling and shooting within the limited time and place due to the presence of the opponents, they will be considered skillful in playing futsal. Therefore, futsal playing skill are a matter of selecting and displaying the variation of passing, receiving and dribbling in an effort to maintain possession of the ball in order to approach the opponents' goalpost so that the players can shoot the ball in order to score a goal.

One of the fundamental aspects of human performance measurement through sport skill tests is sport skills measurement [16]. In 1960, AAHPER started developing sport skill tests [17]. 103 sport skill tests from 26 sports were successfully published by Collins and Hodges [18]. The sport skill test was just revised without inventing a new test between 1984-1991; rather, the sport experts just proved the effectiveness of the test by using the new method in this period. Through a book entitled *Assessing Sport Skill* by Strand and Wilson, the sport skill test gained its enthusiasm again in 1993. Futsal Skill Tests might be developed as a tool for estimating the level of futsal skills based on the present time futsal and the development of sport skill tests.

The sufficiency of the test should be considered as a good measurement tool by the test users. Validity, reliability and objectivity are the criteria of a test that might be implemented to measure the performance of the players [19]. If a test is valid, reliable, objective and if it can be administered immediately, it is considered a good test[18], that has assessment norms [20]. The criteria that should be met in order for the sport skills test to be categorized "Good" and for it to be administered is the validity and the reliability of the test. The Futsal Skil Test (FST) have validity which is used to assess futsal skills (passing, receiving, dribbling and shooting) which are always on display when the experts are playing [21]. To assess futsal skill for male or female university players, the FST could use validity by criterion-related validity and reliability by rest-reset reliability[22].

In Yogyakarta, some futsal championships for high school have been held. When it has reliability proof, FST can be a good test to estimate the level of futsal playing skills in high school players. The study is aimed at proving the reliability of FST could be categorized as a good test for high school players.

II. METHOD

A. Participants

The volunteers for this study are Forty eight male players from high school futsal teams. Four high schools in Yogyakarta are represented in the futsal team. The participants were from a variety of outfield playing positions and took part in in regular training and match-play

B. Lay out of Futsal Skill Test

The Futsal skill test site is illustrated in figure 1. An 8 x 12 meter-wide court is the test area. Two deflection boards which were 1 meter wide and 40 centimeters high to serve as the passing targets, two goals which were both 3 meters wide and 2 meters high were put to serve as the shooting targets, three passing areas which were 1 x 1 meter in size, two shooting areas which were 1 x 1 meter in size, six ball placement points which were 1 meter x 60 cm in size, two dribbling reversal points which were 1 meter x 20 cm in size and 13 cones with a diameter of 20cm were all put on this testing area by the researcher. The deflection boards were equipped with five colors as the passing targets before being placed and the sequence of the colors was white, yellow-red, red, and white; each color was 20 centimeters wide. Shooting obstacle targets which were 1 meter-wide and 2 meters high were then hung in the middle of each goal.

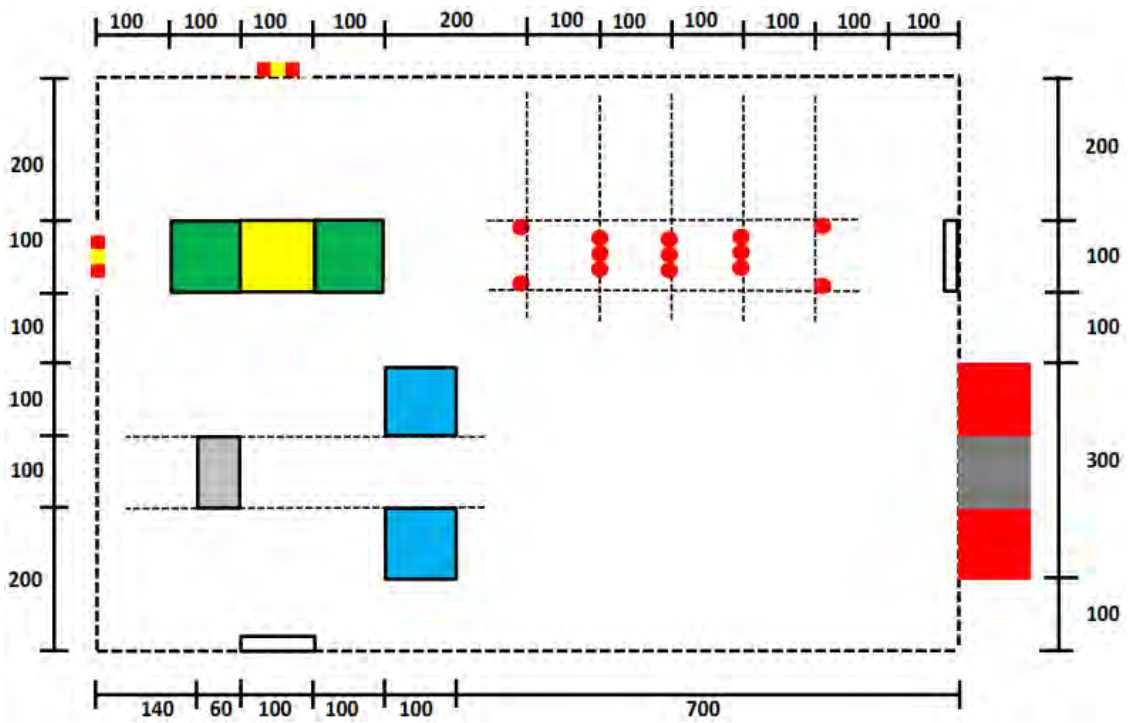

Fig. 1. Diagramatic representation of Futsal Skill Test. (*FST*)

= passing area; = passing area; = shooting area; = pivot dribbling; = cone; = six balls place; = passing target; = goal (shooting target)

C. *Instructions for Futsal Skill Test*

With the ball that had been put inside the area, the subjects stood in front of the yellow passing area. The subjects passed the balls onto the target board six times in the first part of the FST and the first testor began taking the time while using a stopwatch and the time was counted from the first time that the subjects hit the ball. Secondly, the balls were dribbled straight to the reversal box and returned to the yellow passing area by the subjects. Thirdly, a sequence of passing about six times involving two targets was performed by the subjects. Fourthly, the ball was dribbled in a zigzag pattern following the obstacles to the reversal box and returned to the green passing area by the subjects. Fifthly, a sequence of passing from two different green passing areas to one target in turn was performed by the subjects six times. The subjects shot the ball three times, two times with the dominant leg and one time with the other leg, from two blue shooting areas as the sixth part of the test and the test was concluded. However, after three shots, the player did not score a goal then he should perform other shooting activities using the available seven balls until he scores three goals. The test would be concluded if the player still couldn't score after using the seven balls. While the second to the seventh balls were put in the grey area, performing the sequence of futsal skills was the use of the first ball. When the ball entered the goal for the third time or the last ball passed the goal line for the last time, the test officers stopped the time by turning off the stopwatch.

When the subjects hit the first ball, the first tester turned the stopwatch on and when the subjects had finished performing, he turned it off. The subjects' errors were noted and converted into penalty time during the test administration by the second tester (Table 1).

Time Taken and the Penalty Time in performing the sequence of Futsal Skill Test were used to form the score of Performance Time. By adding the time according to the errors that had been committed, the errors were defined into a penalty. The total time attained from the addition of the Time Taken and the Penalty Time was the test score. The best score from two experiments would be used as the text score. After all players finished performing the first experiment, the second experiment was conducted.

TABLE I. PENALTY TIME IN FUTSAL SKILL TEST

Item Test	Type of Erros	Penalty Time
Passing and receiving	Ball hitting the red target	.50 sec.
	Ball hitting the white target	1.00 sec.
	Receiving ball outside the ball	1.00 sec.
	Passing the ball outside the box	1.00 sec.
Dribbling	Touching ball less than 5 times	1.00 sec.
	Ball touching the cone	1.00 sec.
	Shoes touching the cone	1.00 sec.
	Ball not in the reversal box	1.00 sec.
Shooting	Shooting outside the box	1.00 sec.
	Ball hitting the goal obstacle	.50 sec.
	Ball hitting the bar	1.00 sec.
	Ball outside the goal target	2.00 sec.
General	Touching ball with hands	2.00 sec.

D. Data Analisys Technique

By using Pearson correlation coefficient (r), intraclass correlation coefficient (ICC), and coefficient of variation (CV), the reliability was determined [23]. For r and ICC, a level of .05 was considered significant. A correlation coefficient (r) of .65 and above was considered high [24]. An ICC was higher than .75 are reliability acceptance [25]. The indicators of reliability acceptance were shown by the value of CVs that were 10% or below[26].

III. RESULTS AND DISCUSSIONS

The mean and the standard deviation of the high school players' Performance Time (the Time Taken and the Penalty Time) from the first and second trials were shown in table II. The first trials of the players were not as good as their second trials. There were high correlations between trials for the time taken and performance time the FST (r=.824 and .736, p<.05). Although significant, the correlation for penalty time was low (r=.377, p<.05). All value of r variables were significant, but time taken and performance time were accepted reliability. Besides reliability acceptance for time taken and performance time (.901 and .840), there were significant ICC for all variables (p<.05). While the CV for time taken and performance time was reliability acceptance, the CVs of time taken, penalty time and performance time were 3.80%, 21307% and 5.40%.

TABLE II. MEAN (±SD) FUTSAL SKILL OF HIGH SCHOOL PLAYERS

Variable	Trials (second)	
	1	*2*
Time Taken	67.22 (± 7.48)	66.86 (± 8.32)
Penalty Time	12.41 (± 3.56)	12.61 (± 4.79)
Performance Time	79.62 (± 9.71)	79.46 (±11.66)

TABLE III. RELIABILITY FOR HIGH SCHOOL PLAYER

Variable	r	sig.	ICC	sig.	CV (%)
Time Taken	.824	.000	.901	.000	3.80
Penalty Time	.377	.008	.531	.005	21.30
Performance Time	.736	.000	.840	.000	5.40

[a.] r = Pearson correlation coefficient; ICC = intraclass correlation coefficient; CV = coefficient of variation;

The consistency between the assessment results and the measurement results is referred to as reliability. From the administration of the Futsal Skill Test, the consistency of measurement results has been attained. Meanwhile, the degree of consistency of the measurement results had been the reliability of Futsal Skill Test. There were improvements on the time taken, the penalty time, and the performance time in the first and second trials for the high school players (Table II). From r (>.65), ICC (>.75), and CV value (≤10%), the reliability for high school players has been attained for time taken and performance time but not for penalty time. Therefore, if it stands alone, the presence of penalty time will be inconsistent but if penalty time is included into time taken become performance time, it will be consistent. The evidence of reliability does also apply to time taken and performance time of FST and not only to penalty time.

A reliable tool for measuring the performance time is evidence which the FST has had. This test might be used to estimate the performance time level; as a result, this test might be used in a study. Through r, ICC, and CV, the test reliability value had been attained from the test-retest method. Nevertheless, in order for the evidence of the test reliability to be enriched, there should be further studies that make use of other reliability estimation methods and other subjects.

Measuring the performance time of the general futsal players is another thing which the FST might be administered for. Two decimal second is the form of the score of the FST according to the opinion by [27], that futsal is a very dynamic and very fast game. Consequently, the appropriate criterion for describing the performance is time. Therefore, the more skillful the players are, the quicker the time they attain from the Futsal Skill Test will be. Time taken and penalty time are the two components of the Performance time score. While the time that a player commits errors with during the performance time is the penalty time, the time taken is the time that a player needs to perform a sequence of tests.

The combination of speed and accuracy in performing the test sequence is the performance time score. Futsal is a fast, dynamic game played on a small pitch [28]. It is demanded of futsal players to play fast on a relatively small pitch; as a result, the players relatively commit errors. Therefore, speed and accuracy become an important part to be displayed in the performance time. Futsal techniques in a relatively small (narrow) space are displayed by the performance time in the form of speed and accuracy.

Two important variables namely speed and accuracy in the futsal skill are noted by this test. Futsal players should be able to perform a sequence of futsal techniques quickly and accurately because the two different variables have contradictory aspects. Either performing the techniques

quickly but not accurately or performing the techniques accurately but slowly will be the choice. Understanding, practice, and performance are the procedures in learning skills according to Fitts and Posner (1967) [29]. Skills refer to the execution of movement in an activity or a game in the performance. The players should be focused on the objectives rather than the process of displaying the related movement when they display the skills. The player's mind is replaced by automation when the skills have been performed. So that they can adapt to the situation faster and more accurately, the players with better performance times can display the futsal skills more automatically.

The items that have been put into a skill test are the movements in the FST. The item should be similar to the game situation if sport skill is being measured [18]. The movements that are dominantly performed in a game of Futsal are passing, receiving, dribbling and shooting. These movements are always performed by all players except the goalkeeper. However, heading and goalkeeping are two techniques that have not been included in these movements. In futsal games, the dominant movements will always be on display. The more dominant the skills are the more items that a test will have. The movements of passing and receiving have three items, those of dribbling have two items, and those of shooting have one item. This is because in comparison to the other movements in a futsal game, passing and receiving are the dominant movements.

A point on a score scale in which scores at or above the point are in a different category or class is known as the cutoff score. To obtain a cutoff score, the known-group procedure (contrasting group method) was used. Differentiating between masters and nonmasters for deriving is to select the point of intersection of the two distribution groups [30]. To decide who 'passes' or who 'fails' a test, a cutoff score or pass score should be set for that test [31]. Therefore, the limit of eligibility as a top-level futsal school player can be determined.

IV. Conclusions and Suggestions

A. Conclusions

The Futsal Skill Test has been designed by the research. Because the test has already had sufficient reliability, it can be categorized as a good one. The use of correlation coefficient and coefficient of variation is used to determine the reliability. The Futsal Skill Test can be administered as a tool that measures or that estimates the futsal performance time.

B. Suggestions

Toward the subjects who meet the criteria of population in this study, this test has been feasible for administration in order to measure the futsal performance. The cutoff score for high school players might be set as a requirement for the acceptance in the competition level by future studies. This is a field-based test which still benefits the human's skills; thus, by involving technological implementation, future studies might be developed so that the test might be operated with the help of automatic sensors.

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