

The Validity and Reliability of Cognitive Tests for Decision Making on Soccer Players

Ali Imron
Magister Program of Sport Education
Universitas Negeri Surabaya
 Surabaya, Indonesia
 aliimron@mhs.unesa.ac.id

Wijono
Sport Coaching Education
Universitas Negeri Surabaya
 Surabaya, Indonesia
 wijono@unesa.ac.id

Miftakhul Jannah
Education Technology
Universitas Negeri Surabaya
 Surabaya, Indonesia
 miftakhuljannah@unesa.ac.id

Setyorini
Sport Education
Universitas Negeri Surabaya
 Surabaya, Indonesia
 setyorini.prakoso@gmail.com

Abstract—the ability to make decisions becomes an important cognitive skill possessed by soccer players. Practicing tactical awareness is an effective alternative in improving the ability to make decisions. And it has become a habit of a lot of soccer practice, these skills are trained through practice in the field. However, the cognitive evaluation process is still not considered when it is out of the field. To complement the coaches evaluation tool, an evaluation tool is needed to monitor the cognitive processes of the player. The purpose of this article is to explain the results of the development of an evaluation tool for the ability to make decisions for soccer players in terms of the cognitive domain. Development is carried out through define, design, development. A total of 18 football school students in the U16 age group who were familiar with full ground tactics 11 vs 11 were the subjects of the study. Aiken's V is used to analyze the validation of the results of evaluations by academics, sports psychology, national league coaches, and former national players. Furthermore, reliability was analyzed using split-half. The results of the study showed that the value of the validity and reliability of the instrument had met the eligibility requirements of the measuring instrument. It was concluded that the developed instrument could be used to measure the cognitive abilities of athletes in making decisions. Furthermore, in this article we will discuss the functions and urgency of using measuring instruments to make decisions in soccer practice, especially for beginner players.

Keywords—cognitive test, making decision, and soccer.

I. INTRODUCTION

Football is a sport that is most popular with people in Indonesia. However, Indonesian football has yet to achieve satisfactory achievements and even experienced a setback to the freezing of the parent of the Indonesian football (PSSI) sport by the highest international football federation (FIFA) in 2015. All because the core components and support in football do not support and complement each other. Then in 2016 FIFA sanctions were lifted in the hope of improving all aspects of Indonesian football itself.

There are several aspects or components in football that we must fulfill to achieve sports achievements in football. For sports assessment to be comprehensive, it must address all variables of sports development, such as psychological, social-emotional, physical and physiological, technical and tactical [1]. Modern football is now also called possession football, ideal possession soccer requires players. To play football possession requires players who have technical, tactical, physical and mental abilities capable [2]. According

to Scheunemann, in the philosophy of the coaching program there are four complementary components in football, namely, Physical, Technical, Tactic and Mental [3]. Based on Darmawan and Scheunemann's statement, it can be concluded that in football there are components including technique, tactics, physical and mental. Most other sports also have components that are almost the same as football where the technical and physical components are directly related to the physical condition of the athlete physically, while the tactics and mental components are joined by the athlete's physical and psychological activities.

Psychological athletes or psychological components in football are very influential especially in the tactics and mental components of the players themselves. In the component of tactics is a supporting possession in football, while possession football is largely determined by decisions [4]. Because it needs players who are able to make quick and precise decisions. According to Darmawan, a quick and precise decision can be made if the player has a qualified tactic insight in which there is an understanding of the principle of play, namely: support, width, depth, mobility, penetration, creativity, shape [3]

The mental component of a player in football can be known or described through several tests including mental tests that have been developed, namely anxiety tests before competition, imagery tests and so on. Meanwhile, to find out the components of tactics in football so far only through skills tests directly. However, tactics such as those already known are decision making or problem solving in the field and this activity is strongly influenced by the way of thinking and understanding of playing in football. The discussion about cognitive abilities is discussed by experts in. Until now, the cognitive process and the dimension of knowledge have been the benchmarks of cognitive abilities, but both need to be integrated to be able to provide a picture of cognitive abilities themselves [5]. Cognitive ability is an observable appearance of mental activity (brain) to gain knowledge through one's own experience. In terms of sports science, cognitive abilities used in games are referred to as cognitive-motor performance (CMP), defined here as the capacity to rapidly use sensory information and transfer it into efficient motor output, represents a major contributor to performance in almost all sports, including soccer [6].

During this time to see the tactics of playing football the coach team only saw through how to play on the field and that

could be influenced by the subjectivity of the coach to the player. And so far there have been no test tactics that relate directly to the player's cognitive and which can be accounted for and can be measured clearly. For this reason, it is necessary to develop a test that can describe the character of a player in making football decisions or tactics related to the cognitive use of the player.

Tactic tests or cognitive tests that need to be developed must certainly be more specific to describe each player's character in football. This is because each position in football has different characteristics. The division of positions in football is generally divided into three positions, namely the front position (attacking), the middle position (midfielder) and the back position (defending). The division of positions in general is based on the division of zones namely zone 1, zone 2 and zone 3. Whereas the characteristics of soccer players based on the principle of play (tactics) are divided into 2 namely defensive player characters and attacking players [3].

Based on the division of characteristics of football players according to the principle of playing or playing tactics, that is, defenders and attackers are very opposite in making decisions and how to play them. To be more specific and focus on researching, it is necessary to choose one of the characteristics of the player according to the tactics or how to play it. Players with attacker characteristics in this case will be the main sample in making cognitive tests in this soccer branch, so a study titled "Development of cognitive tests of the ability to make decisions on attacking strategies on soccer players".

II. METHOD

A. Type of Research

The development of a cognitive test of the ability to make an attack strategy on football players was developed using the Thiagarajan development research model which is often referred to as a 4-D model. Thiagarajan's research and development goes through four stages, namely defining, designing, developing and dissemination [7]. However, the research on the development of cognitive-motor tests on players in the attacking position of the football sports is only done until the development stage.

B. Subject

This research was conducted on soccer players who train in the soccer school. They fall into the U16 player age group. They have received the Ground 11 vs 11 tactics training and are considered familiar with training. So that they are considered to have received sufficient tactical training.

C. Instrument

The instrument developed is the measurement of the cognitive domain to determine the ability of players to make decisions. This test will be devoted to measuring the ability of players to make decisions when attacking positions. There are 10 items of questions which are included in the measurement of high level cognitive domains (analysis) tested to players. How to answer a question can directly write a description of the answer or interview.

D. Analysis

To analyze the data obtained, descriptive statistics are used. Furthermore, Aiken's V is used to analyze the validity of the instrument [8], [9]. Whereas to analyze instrument reliability, split-half test is used [10].

III. RESULT

The results of the study will contain the results of the stages of developing instruments ranging from define, design, and development. Each stage will be explained the way and results obtained.

A. Define stage

The defining stage functions to define and define the requirements of developing a cognitive test of the ability to make decisions on attack strategies on soccer players, by analyzing the goals and boundaries of the material. The definition phase consists of five steps, namely analysis of the training process, player analysis, analysis of training material, analysis of concepts and formulation of instructional objectives.

B. Design stage

The purpose of this stage is to design a test that will be developed so that an initial product is obtained (Draft I) in the form of a cognitive test of the ability to make attack strategy decisions on soccer players. In addition to the initial product of a cognitive test instrument (Draft I) at the planning stage, the assessment rubric was designed as the basis of an answer and also as a limitation of answers which later was revealed to be a scale assessment as the best decision maker chosen by the research subject. In the planning phase, it consists of four steps, namely the preparation of the test instrument, preparation of the assessment rubric, expert validation and initial design (Draft II).

C. Development stage

The purpose of the development stage is to produce a Draft V test of cognitive ability to make attack strategy decisions on revised football players based on expert input, and data obtained from trials. Activities at this stage are expert evaluations (validation), trial validation 1, trial validation 2 and trial validation 3.

D. Analysis Statistic for Validity and Reliability

The validator's assessment of the development of cognitive tests of the ability to make attack strategy decisions on soccer players includes several aspects, namely the test objectives, the concept of the test, the test steps, the time, and the language used.

VALIDITY INSTRUMENT BY AIKEN'S V

| Item | ΣS | V-value | Conclusion |
|--------|----|---------|------------|
| No. 1 | 12 | 0.60 | Valid |
| No. 2 | 14 | 0.70 | Valid |
| No. 3 | 13 | 0.65 | Valid |
| No. 4 | 12 | 0.60 | Valid |
| No. 5 | 13 | 0.65 | Valid |
| No. 6 | 13 | 0.65 | Valid |
| No. 7 | 15 | 0.75 | Valid |
| No. 8 | 14 | 0.70 | Valid |
| No. 9 | 14 | 0.70 | Valid |
| No. 10 | 12 | 0.60 | Valid |

This assessment uses content validity where after face to face validity is then carried out further analysis by experts

using logical validity with the Aiken's V approach that is by giving an assessment of the test instrument that has been developed with the range of values given is 1 (lowest) and 5 (highest). The results of a brief assessment of the validity of the test by the validator are presented in table 1. The results of V value for item 1-10 are values range from 0.60 to 0.75, can already be considered to have adequate content validity. After the instrument is declared valid, it is then tested on soccer players. The results of the tests will be described using descriptive statistics and analyzed using split-half to find out their reliability.

RELIABILITY INSTRUMENT BY SPLIT-HALF ANALYSIS

| Item | Mean | SD |
|---------------|------|-----|
| No. 1 | 3,1 | 1,4 |
| No. 2 | 3,7 | 0,7 |
| No. 3 | 3,3 | 1,1 |
| No. 4 | 3,2 | 1,1 |
| No. 5 | 3,7 | 1,0 |
| No. 6 | 3,7 | 0,8 |
| No. 7 | 3,1 | 0,8 |
| No. 8 | 4,0 | 0,0 |
| No. 9 | 3,4 | 0,8 |
| No. 10 | 3,4 | 0,5 |
| Total score | 622 | |
| Score of odd | 297 | |
| Score of even | 329 | |

Based on table 2, the results of the reliability test produce r-count which has been rounded up which is 0.61, then the t-table value is then searched as an intermediary for calculating r-table and found the value of t-table is 2.08. After determining the t-table then we calculate r-table and specify r-table 0.42. The next step to determine the reliability of cognitive tests is the ability to make attack strategy decisions on soccer players by comparing r-count with r-table and if r-count (0.61) > r-table (0.42), then the instrument for cognitive tests of ability make a strategic attack decision on otherwise reliable soccer players.

IV. DISCUSSION

Viewed from the results of research on cognitive-motor tests on players in the attacking position of soccer sports branches during data collection and data analysis that have been done by coaches or very positive players, this is supported by the results of research that can answer the problem which is faced, namely in describing the cognitive conditions of the players that are possible can be used to help a coach (coach) in determining the weakness of a player attack position (attacking). In addition, it can also be petrified to follow up on the weaknesses of the players to compile an training program that will be applied to players attacking positions. This is corroborated by the results of research which states that cognitive-motor tests on players of attacking positions in football sports are declared valid and reliable [11].

Based on observations, it can be seen that the results of cognitive-motor tests on players in the attacking position of soccer can also be used as virtual training where virtual

training techniques in football can also provide inspiration in visualizing creative thinking when making decisions in soccer games. Furthermore, these findings indicate that the validity and reliability of these instruments are a measure of the appropriateness of the instruments developed by this instrument to be used to assist trainers in scouting efforts or the selection process. The results of other studies indicate that performance tests in the form of "kinetic finesse" correlate significantly with "mental strength" [12]. That is, mental abilities in the form of athlete's cognitive becomes important as a reference for athlete's ability. Because sport is not just about physical, but also an overall increase in speed of information processing, especially in producing various alternatives to make decisions [13].

Not only for beginner athletes, even for elite athletes, evaluations of cognitive athletes are carried out. It aims to examine the cognitive role in athlete success in producing optimal play performance. Certainly every football player are required to anticipate and react continuously in a changing, relatively unpredictable situation in the field [14]. For this reason, the presence of cognitive measurement instruments in athletes is an important finding for coaches as an evaluation tool for their athletes.

V. CONCLUSION

Based on the results of the research on the development of cognitive tests of the ability to make attack strategy decisions on soccer players, it can be concluded that the results of the development of cognitive tests of the ability to make an attack strategy on football players are re-analyzed to determine the reliability of the test by looking for r-count, t-table and r-table through the data that has been collected using Microsoft Excel. Before determining r-count, t-table and r-table first the data is divided into 2 parts using the split-half technique that is by dividing odd and even items. Based on the reliability test to produce r-count that has been rounded up is 0.61; t-table 2.08; and r-table 0.42. After obtaining the r-count and r-table then compared r-count with r-table and obtained r-count (0.61) > r-table (0.42), then the test instrument for cognitive tests of the ability to make strategic decision-making attacks on otherwise reliable football players.

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