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# Talent identification model for sprinter using discriminant factor

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# Talent identification model for sprinter using discriminant factor

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**Abstract.** The main purpose of this study was to identify young talented sprinter using discriminant factor. The research was conducted in 3 steps including item pool, screening of item pool, and trial of instruments at the small and big size of samples. 315 male elementary school students participated in this study with mean age of 11-13 years old. Data were collected by measuring anthropometry (standing height, sitting height, body mass, and leg length); testing physical fitness (40m sprint for speed, shuttle run for agility, standing broad jump for power, multistage fitness test for endurance). Data were analyzed using discriminant factor.
The result of this study found that there were 5 items that selected as an instrument to identify young talented sprinter: sitting height, body mass, leg length, sprint 40m, and multistage fitness test. Model of Discriminant for talent identification in sprinter was D = -24,497 + (0,155 sitting height) + (0,080 body mass) + (0,148 leg length) + (-1,225 Sprint 40m) + (0,563 MFT). The conclusion of this study: instrument tests that have been selected and discriminant model that have been found can be applied to identify young talented as a sprinter.

## 1. Introduction

Science and technology in sports are the important things that can be used to develop sports achievement. One of the goals of doing sports is to achieve the excellent performance. Achievements can be obtained by conducting structured and systematic in sports coaching. Sports coaching should be based on scientific concepts that supported by sports science and technology. Through science and technology can carry out the training process, identifying, selecting, and predicting young talented athlete effectively and efficiently. The aim of talent identification is for identifying and selecting young talented athlete that valid and reliable. This is necessary to obtain accurate results in predicting young talented athlete for future. It is hoped that young talented athlete who is identified and selected can compete at the international level.

There are some talent identification models that have been developed by some countries including Germany, Japan, China, Scotland, and Australia [1–5]. Some literature report that there is some talent identification which specifies for sport such as volleyball [6–14]. Talent identification in Indonesia needs to be developed systematically and continuously, especially for a sprinter. Therefore, the purpose of this study is to identify young talented sprinter using discriminant factor in order to identify young talented sprinter effectively and efficiently.

Table 2. *Canonical Discriminant Function Coefficients*

| | Function |
|---|---|
| | 1 |
| Sitting Height | .155 |
| Body Mass | .080 |
| Leg Length | .148 |
| Sprint 40m | -1.225 |
| Multistage Fitness Test | .563 |
| (Constant) | -24.497 |
| Unstandardized coefficients | |

Another crucial finding as clearly depicted in Table 2 that the coefficients of each variable can be formed in a discriminant function, as the following discriminant functions: D = -24.497 + (0.155 Sitting Height) + (0.080 Body Mas) + (0.148 Leg Length) + (- 1.225 40m Sprint) + (0.555 Multistage Fitness Test). Based on the equation it is seen that the average value of 40 m sprint is the most dominant to predict the difference of talent category (Sprinter and non Sprinter) because it has the highest coefficient that is 1.225 and the lowest in predicting sprinter talent category is body mass with coefficient 0,080.

In Phase 1, a Selected Test Instrument Design (RITT) was prepared based on the results of some literature reviews and consultation with a team of sports experts. The selected instrument was found 11 items. For anthropometric measurements consisting of body height, body mass, sitting height, and leg length; for physical fitness tests such as 40 m sprints, vertical jumps, standing broad jumps, arm muscle strength (push up), abdominal muscle strength (sit up), flexibility and multistage fitness tests (MFT).

The selection of the RITT refers to a sports search model that has been modified by [11]. The number of instruments based of Aussie Sport [5] model was 10 items instrument consisting of 4 anthropometric measurements of body height, sitting height, body mass, spam arm, and 5 physical fitness tests including 40m sprint, vertical jump, shuttle run 5m, basketball throw, throw and catch tennis ball, and multistage fitness test. The instrument of the modified sports search model has been tested for its validity and reliability [15].

Based on the trial results and discriminant analysis showed that there were 5 items of measurement tests consisting of anthropometric measurements (body mass, leg length, and sitting height); and physical tests (40m sprints) and Multistage Fitness Test (MFT), later referred to as Selected Instruments Test (SIT). Based on the discriminant equation it seems that 40m sprint was the most dominant value in predicting young talented for sprinters. 40m sprint is one form of test to determine the level of one's physical fitness in the component speed. Sprinters require components of physical fitness, especially acceleration and speed in supporting their performance. Furthermore, sprinter also requires cardiovascular endurance as one component of physical fitness that must be owned. This is because the endurance capability is needed by a sprinter in doing various exercise activities. The Sprinter needs a repetition of a short sprint that must be done many times each day. Therefore good cardiovascular endurance can certainly support these activities.

To determine young potential athletes including young talented sprinter or non sprinter, simply by including the results of anthropometric measurements, and physical fitness tests in the model of discriminant equations that have been designed. Therefore, trainers, teachers of Physical Education, and parents will be able to know whether their students are talented in sprinters or non sprinters. The discriminant analysis model that has been produced can be used as an instrument to classify the sprinter talent category or non sprinter for children aged 11-13 years.