



Validity and reliability of standard admission for form six sport science students instrument (SMART)

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Abstract

This study was conducted to identify the value of validity and reliability of the Standard Admission for Form Six Student instrument (SMART). This instrument contains an assessment of the level of physical fitness and basic knowledge of sports science content of Form Six students. The method of this study uses a normative survey which involves 390 respondents consisting of 148 male students and 242 female students. Respondents were selected at simple random from 10 Form six schools throughout Malaysia. The FITNESSGRAM® test battery and the Sports Science Content Basic Knowledge test were used as evaluation instruments in the data collection process. Reliability values for physical fitness instruments using test and retest methods. Validity values of basic knowledge of sports science content instruments using expert validity while reliability values use Kuder Richardson (KR₂₁) analysis. Therefore, it can be concluded that the Standard Admission Form Six Sports Science Student instrument has the strength to assess students holistically which includes the assessment of the level of physical fitness and knowledge of students to produce quality students.

Keywords: instrument, form six, sport science student, fitness and content knowledge

Introduction

The rebranding of form six education was done to achieve one of the initiatives proposed by the Ministry of Education Malaysia (MOE) in the Malaysian Education Development Plan (PPPM) 2013 – 2025. Through this plan, this branding strengthens form six education in terms of improving the image, improving the level of quality and has its own education system that is equivalent to the education system at Matriculation or Science Foundation Centre. This is because through this form six, students are able to further their studies to university as one of the main routes (Kementerian Pendidikan Malaysia, 2015) ^[12].

It is very necessary at this time for Sports Science students to master two important elements, namely the level of physical fitness and the basic knowledge of Sports Science content to enable them to compete globally. Emphasis should be given to students in order to master both these areas theoretically and practically. Through the aspect of health-based physical fitness, Sports Science students are able to have a good level of health and are able to avoid the risk of hypokinetic diseases and a sedentary lifestyle while adopting a balanced diet (Mohd Syukran Abdul Kadir, Ahmad Syariff Ahmad Tajudin & Kevin Tan, 2013; Beets & Pitetti, 2005) ^[18, 5].

It is the responsibility of the school, especially the teachers involved to produce quality students in terms of physical fitness and knowledge of Sports Science content. The goal of the Sports Science subject was created to produce students who are knowledgeable in Sports Science and skilled in this

field to enable students to improve the level of sports performance. In addition, being able to adopt a healthy lifestyle, as well as pursue studies at the highest level and venture into career fields related to this field. Therefore, providing students who master the field of fitness and Sports Science knowledge should be a priority of certain parties such as MOE, Malaysian Examinations Council and school to realize this expectation in order to be a quality student (Majlis Peperiksaan Malaysia, 2012) ^[15].

However, in order to produce Sports Science students who, have a good level of physical fitness and knowledge, it is necessary for a new mechanism to be created so that the selection of students for admission to this major is streamlined by selecting qualified students. This means, students who have a high mastery of the aspects of physical fitness and a good academic level should be given priority to enter the Sports Science major because they are truly deserving students. According to Geanina dan Stefan (2015) ^[9], individuals who have a high level of physical fitness show to have a good level of health. However, this level of fitness depends a lot on the exercise or physical activity performed (Mohd Syukran Abdul Kadir, Ahmad Syarif Ahmad Tajudin & Kevin Tan, 2013) ^[18]. Besides that, according to Norlena Salamuddin dan Mohd Taib Harun (2003) ^[19], knowledge of the content of this subject is very important to students who want to continue their studies in the field of Sports Science and this shows that students can apply what they have learned in the mainstream to the subject of Sports Science in Form six later.

The process of selecting students to major in Sports Science course needs to be examined and given attention as so far the admission of students to majoring in Sports Science is based on students' interests without any specific mechanism to select students who are truly qualified for this major. The above statement is in line with Mohamad Fhaizal Mohamad Bukhori *et al.* (2015) ^[16], which states that the selection of Malaysian Certificate of Education (SPM) graduates whether to preuniversity, matriculation and foundation programs is based on their own interests and preferences.

Systematic selection of students can help improve students' ability to master a field of learning that they are involved. In retrospect, creating an instrument or mechanism in the selection of students to produce quality students is important and something that must be done. Sriram (2014) ^[21], explains that student selection instruments assess students' level of progress before, during and after a program. This selection process is also supported by Lambert (2008) ^[14], who found that the student selection process based on skills and knowledge is essential in determining student success to increase the level of professionalism experience.

Howatson dan Dancy (2009) ^[10], found that students admitted to the Sports Science program through selection screening were better than students admitted to the program without selection screening. This shows that it is time for the selection system for Form six students to major in Sports Science to be established in order to produce quality students in terms of mastering the level of physical fitness and basic knowledge of Sports Science content. Improvements to this system coincide with the projections in the Malaysian Education Development Plan (PPPM 2013-2025) namely empowering form six through system improvement, image improvement and also quality improvement (Kementerian Pendidikan Malaysia, 2013). The objective of this study is to identify the value of validity and reliability of the assessment instrument of the Standard Admission for Form Six Sports Science Students (SMART).

Material and Methods

This study uses a normative survey design which is one of the popular research methods and widely used in the fields of education, psychology, sociology and physical activity (Chua Yan Piaw, 2006; Thomas, Nelson & Silverman, 2011) ^[6, 22]. Normative survey studies generally aim to collect physical fitness activity performance data or knowledge of a large sample of the population and present the results in the form of comparative standards, or norms (Thomas, Nelson & Silverman, 2011) ^[22].

The researcher determined the selected sample size of 357 people based on the sample table presented by Cohen, Manion, dan Morrison (2007) ^[7]. Nevertheless, researchers have selected a total of 390 people as the study sample to avoid losing the sample at the last minute during the data acquisition process due to health problems or absenteeism.

This study uses an instrument to obtain research data which consists of the assessment instrument of the Standard Admission of Form Six Sports Science students. The Standard

Admission for Form Six Sports Science Instrument (SMART) students includes two instruments namely the Prudential FITNESSGRAM® test battery used to test the health-based physical fitness component and the Sports Science basic content knowledge instrument used to test the students' cognitive component.

The formation of the Standard Admission instrument for Form Six Sports Science students is based on two processes, namely using the ADDIE Model (Rossett, 1987) ^[20] and instrument testing process based on Morrow, Mood, Disch dan Kang (2016) ^[11]. ADDIE Model (Rossett, 1987) ^[20], used as a guide to researchers in the process of constructing the Standard Admission for Form Six Sports Science Students instrument. Construction procedures start from assessment analysis, design, development, implementation and evaluation. At each stage or phase, the researcher conducts a review to ensure that it is suitable for use and meets the requirements of the measured testing criteria.

This assessment instrument includes two tests, namely the physical fitness test and the Sports Science basic content knowledge test. Both of these instruments are used to show student achievement based on the level that has been built by the researcher, namely the level of weak, moderate, good, very good and excellent. The division of these levels is based on the norms that have been developed according to certain criteria by using the norm curve grade method as well as weighting in determining the grade as expressed by Ahmad Hashim (2014, page.16) ^[2] and Baumgartner, Jackson, Mahar dan Rowe (2007, page. 131) ^[4].

For the physical fitness level test, the researchers selected a number of tests that have been validly used to test components in physical fitness that include health components. Researchers used the Prudential FITNESSGRAM® test battery which included the following tests:

1. PACER test
2. Curl up test
3. Push up 90⁰ test
4. Trunk lift test
5. Body Mass Index (BMI)

For the knowledge level test, the researchers used a test instrument with four answer choices containing 40 questions based on the syllabus which covers four areas. Researchers allocated 10 multiple choice questions for each field that has been set. The construction of this question item is based on Bloom's taxonomic theory (1956), at three main levels namely the level of knowledge, understanding and also the level of application. The construction of this question item is also based on the Test Specification Table (JSU). This set of questions was submitted to three experts in the field of Sports Science to validate and acknowledge the content of the test questions in order to comply with the requirements of the researcher's study. The content of this instrument covers the following areas:

1. Field of introduction to Sports Science
2. Fields of anatomy and physiology

3. The field of physical fitness
4. The field of sports coaching

Findings

Physical fitness test

Researchers obtained reliability values for physical fitness instruments by using test and retest methods (Ahmad Hashim, 2004) [1]. Based on Table 1, the reliability values for the

Prudential FITNESSGRAM® test battery instrument are $r = 0.91$ for the PACER test. For the Curl Up test, the reliability value is $r = 0.82$, Push Up 90° test is 0.99. Trunk Lift test is 0.82 and BMI test is $r = 1.00$. According Baumgartner *et al.* (2007) [4] and Ahmad Hashim (2004) [1], a reliability value in excess of .70 indicates that the instrument has high reliability. This illustrates the Prudential FITNESSGRAM® test battery instrument suitable for use to measure the physical fitness level of Form Six Sports Science students. Refer table 1.

Table 1: Fitness Test Validity Value

Instrument	Validity	Reliability	Objectivity
PACER	0.87 (Jabar & Ruziyanti, 2010)	0.91 (Saidil Mazlan Abdul Razak)	0.99 (Saidil Mazlan Abdul Razak)
Curl Up	0.93 (Ahmad Hashim, 2021)	0.99 (Saidil Mazlan Abdul Razak)	0.98 (Saidil Mazlan Abdul Razak)
Push Up 90°	0.96 (Lai <i>et al.</i> , 2019)	0.82 (Saidil Mazlan Abdul Razak)	0.94 (Saidil Mazlan Abdul Razak)
Trunk Lift	0.70 (Patterson, Rethwisch & Wiksten, 1997)	0.82 (Saidil Mazlan Abdul Razak)	0.97 (Saidil Mazlan Abdul Razak)
BMI	0.87 (Logical Validity)	1.00 (Saidil Mazlan Abdul Razak)	0.99 (Saidil Mazlan Abdul Razak)

b. Basic Content Knowledge Test

Through this study, researchers have selected three experts in the field of Sports Science to obtain content validity, namely a senior lecturer in Sports Science from the University of Malaya, a senior lecturer in Sports Science from University Sains of Malaysia and a lecturer in Physical Education from the Teacher Education Institute Campus Sultan Abdul Halim, Kedah who each has a PhD holder in Sports Science. Refer table 2.

Table 2: Expert Panel Content Validity Value

Mastery Test of Sports Science Content	Expert 1	Expert 2	Expert 3	M
Set 1	0.88	0.96	0.96	0.93
Set 2	0.90	0.92	0.92	0.91
Set 3	0.82	0.92	0.92	0.89

At the same time with Ahmad Hashim (2015, 2004), which states that written tests typically have content validity provided that the constructed questions have material dependent reliability and learning teaching objectives. So is the view expressed by Drost (2011) [8], that the validity of written test content is usually constructed on the basis of materials and syllabus and assessed by experts in groups. The reliability value of this instrument uses *Kuder Richardson* (KR₂₁) analysis. While to obtain the value of reliability of basic knowledge of Sports Science content, researchers have used *Kuder Richardson* (KR₂₁) analysis based on (Lacy, 2011; Baumgartner *et al.*, 2007) [13, 4]. Table 3 indicates the reliability value for the basic mastery instrument of Sports Science content for set 1 is $r = .77$, set 2 is $r = .64$ and set 3 is $r = .88$. Valette (1977), suggests that the minimum value of the reliability coefficient for an acceptable measuring instrument is .50.

Different with Mohd Majid Konting (2005) [17], which states the value of the reliability coefficient of at least .60. This indicates that the basic knowledge instrument of Sports Science content is acceptable because of the reliability value between .64 to .88. This high reliability value indicates that this instrument is suitable to be used to measure the level of knowledge of sports science students.

Table 3: Reliability Values for Basic Content Knowledge Instruments (n=30)

Set of Question	r	p	D
Set 1	0.77	0.43	0.29
Set 2	0.64	0.57	0.24
Set 3	0.88	0.50	0.25

Conclusion

Therefore, it can be concluded that the assessment Standard Admission of the Form Six Sports Science Student instrument has a high value of validity and reliability and can be used for student admission. In addition, this instrument has the strength to assess students holistically which includes the assessment of the level of physical fitness and knowledge of students to produce quality students and able to make initial preparations in line with the transformation of the education system as contained in PPPM (2013-2025), namely rebranding through improving the quality of the form six system as well as realizing the goal of sports science so that students can apply the knowledge of sports science as a practice to a healthy lifestyle.

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