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The research of physical evaluation criteria for visually impaired male students of Nguyen Đinh Chieu special high school in Ho Chi Minh City

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Abstract
By doing some usual research methods, the theme conducted 3 steps. The findings showed 11 criteria which have enough reliability and notifications to evaluate the physical state of visually impaired male students of Nguyen Dinh Chieu special high school in Ho Chi Minh city.

Keywords: Criteria, physical, special high schools, student, visual impairment

1. Introduction
General physical development support for children with disabilities is a meaningful and necessary work that is of interest to society. For physical development, it is needed to appreciate the physical condition, from which there are appropriate exercises. Therefore, it is essential to understand the physical well-being of visually impaired students. One of the most critical stages of determining success is finding the criteria to evaluate it scientifically, accurately, and following practical conditions and unique learning environment characteristics of students. With accurate evaluation criteria, it helps physical education teachers have appropriate exercises and help students determine their goals to strive and practice. Understanding the importance of this problem, we chose to study the topic "Physical evaluation criteria for visually impaired male students of Nguyen Dinh Chieu special high school in Ho Chi Minh city".

2. Materials and methods
2.1 Research methods: Analyzing and synthesizing materials, interviews, pedagogical tests, and statistical mathematics.

2.2 Object of research: 30 visually impaired male students of Nguyen Dinh Chieu special high school in Ho Chi Minh City.

2.3 Object of interview: 5 management staffs, 9 physical education experts, and 4 physical education teachers.

3. Results and discussion
3.1 Synthesis of physical evaluation criteria for students from domestic and foreign authors
Through reference documents on the physical investigation of Vietnamese people of Vietnam Sports Science Institute [2], regulations on physical evaluation for students of the Ministry of Education and Training [3], Nguyen Van Tri (2012) [9], Nguyen Quoc Thang (2011) [6], Nguyen Quoc Thang (2017) [7], Luu Thieu Son (2016) [5], Physical training standards for high school students of Ho Chi Minh city Department of Education and Training [1], according to physical education books 6, 7, 8, 9 (teacher books) [4]. Through a unique study environment survey and based on the physical characteristics of the object of research, consult the managers and physical education experts, we selected 16 suitable criteria including:

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Shape (5 criteria): Standing height (cm), weight (kg), BMI (kg/m^2), Quetelet (g/cm), Hirtz Index (cm).
Functional (2 criteria): Heart function (HW), Capacity of the lungs (ml).

Physical (9 criteria): 10m sprint (second), 30m sprint (second), Standing long jump (cm), Hand squeeze force test (KG), Standing and bending forward test (padahastasana) (cm), Running 300m (second), Running in 5 minutes depending on stamina (m), Hands clapping in 10 seconds (time), Throwing ball hit the target (point).

3.2 Interview physical education management staff, education experts and lecturers
The research developed the questionnaire and interviewed 5 management staffs, 9 physical education experts and 4 physical education teachers on physical evaluate criteria for visually impaired students. The scale from 1 to 5, (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree. Conduct interviews 2 times, verify the coincidence between the two interviews through index χ^2 (when squared) the results are shown in Table 1.

Datas in Table 1 show that in all the results through both interviews, there are χ^2 calculated $< \chi^2$ tables (= 3.84), so the difference between the two observed values of the sample is not significant, listed at the 5% probability threshold. Therefore, the results between two interviews with experts, management staffs, and physical education teachers have a high uniformity in opinions.

Table 1: Interview results of physical evaluation criteria for visually impaired students of Nguyen Dinh Chieu Special High School

Index	Criteria	1st Interview (n = 18)		2nd Interview (n = 18)		Accreditation	
		Total score	Percentage	Total score	Percentage	χ^2	P
	Shape						
1	Standing Height (cm)	84	93.33	83	92.22	0.08	>0.05
2	Weight (kg)	52	57.78	54	60.00	0.09	>0.05
3	BMI (kg/m^2)	85	94.44	84	93.33	0.10	>0.05
4	Quetelet (g/cm)	52	57.78	54	60.00	0.09	>0.05
5	Hirtz Index (cm)	50	55.56	51	56.67	0.02	>0.05
	Physical						
6	10m sprint (second)	83	92.22	82	91.11	0.07	>0.05
7	30m sprint (second)	55	61.11	54	60.00	0.02	>0.05
8	Standing long jump (cm)	82	91.11	82	91.11	0.00	>0.05
9	Hand squeeze force test (KG)	84	93.33	83	92.22	0.08	>0.05
10	Standing and bending forward test (padahastasana) (cm)	85	94.44	85	94.44	0.00	>0.05
11	Running 300m (second)	86	95.56	85	94.44	0.12	>0.05
12	Running in 5 mins depending on stamina (m)	50	55.56	51	56.67	0.02	>0.05
13	Hands clapping in 10 seconds (time)	80	88.89	80	88.89	0.00	>0.05
14	Throwing ball hit the target (point)	81	90.00	80	88.89	0.06	>0.05
	Functional						
15	Heart function (HW)	85	94.44	85	94.44	0.00	>0.05
16	Capacity of the lungs (ml)	84	93.33	84	93.33	0.00	>0.05

Interview results selected criteria with a total score > 75% of the total score in both interviews (> 67.5 points). Following the principle above, it is possible to select the physical evaluation criteria for object of research including 11 criteria: Shape (2 criteria): Standing height (cm), BMI (kg/m^2); Physical (7 criteria): 10m sprint (second), Standing long jumping (cm), Hand squeeze force test (KG), Standing and bending forward test (padahastasana) (cm), Running 300m (seconds), Hands clapping in 10 seconds (times), Throwing ball hit target (point); Functional (2 criteria): Heart function (HW), Capacity of the lungs (ml).

3.3 Check the reliability and the accuracy of the test
In this study, the criteria determined for functional evaluating are Heart function (HW), Capacity of the lungs (ml) and shape: height (cm), and BMI (kg/m^2). The criterion has been widely used for every object of research and quite stable. They has been measured by modern and accurate tools, so it isn't neccessary to take a re-test reliability and accuracy.

Check the reliability
To determine the reliability, the study conducted on 30 visually impaired male students in Nguyen Dinh Chieu special high school. The test divided into 2 phases, the time between two phases is 5 days, the checking conditions between the two phases are the same. Then proceed to calculate the correlation coefficient (r) of the criteria between the two phases of test and obtain the results in Table 2.

Table 2: Reliability coefficient of the physical evaluation criteria for visually impaired students in Nguyen Dinh Chieu special high school

Index	Criteria	1st phase (n = 30)		2nd phase (n = 30)		Reliability coefficient (r)	
		$\overline{X}$	S	$\overline{X}$	S	R	P
1	10m sprint (second)	3.40	3.13	3.60	3.36	0.99	<0.01
2	Standing long jump (cm)	132.60	15.53	131.40	13.74	0.97	<0.01
3	Hand squeeze force test (KG)	244.00	28.21	248.60	24.58	0.94	<0.01
4	Standing and bending forward test (cm)	27.00	1.61	26.54	2.20	0.96	<0.01
5	Running 300m (second)	3.12	0.45	3.10	0.35	0.96	<0.01
6	Hands clapping in 10 seconds (time)	13.40	1.34	13.20	1.30	0.96	<0.01
7	Throw ball hit the target (point)	9.20	0.84	9.80	0.84	0.88	<0.01

The data in Table 2 shows that all physical evaluation criteria have a reliability coefficient r > 0.8 and P < 0.01. Thus, the above criteria have enough reliability to physical evaluation for object of research.

Check the accuracy of the test
In the practice of sports, the accuracy is often used as empirical accuracy (also known as statistical accuracy). Experimental accuracy reflects the relationship between the results of the test and an intermediate sign that is directly related to the signal to be measured. These intermediate signs are called central factors. In sports measurement, the commonly used central factors are:
- Sports performance is defined by physical measurement units (m, s, kg, number of times). Moreover, it is possible to use composite index when there is no exclusively index. For example: ranking; total score in complex sport...
- The components can be quantified in a full play activity (frequency of running steps, swimming hand cycle frequency, force making in high jump and long jump) [9].

In fact, we may encounter many cases in which there is no "main factor" to evaluate the accuracy. At the same time, there are many tests that are shared for a purpose of measuring one or a group of signs. Specifically, in this study, with personal experience and through consultation with experts, and with qualitative analysis, we have specified physical evaluation criteria for visually impaired students. However, there is no research has identified the index represents physical of students, which is a main factor.
The result shows that there are 7 physical criteria selected. Although these criteria have been used to measure the physical of some object of research, the question is: are these criteria the one to measure the physical of visually impaired students? Therefore, it is necessary to evaluating the accuracy of these criteria for the physical of visually impaired students.
If physical is considered a synthetic factor, then tests that measure physical strength (variables) must correlate with that factor. In order to specify the synthesis factor, which represents these variables (criteria) in the analysises, a statistical analysis called factor analysis is used. The purpose of factor analysis in this case is to transform a set of 7 variables into a synthetic variable (physical).
The role of each criteria for the synthetic factor is shown by the correlation coefficients between those criteria for the synthetic factor (physical). That correlation coefficient is used as a accuracy coefficient. The higher accuracy coefficient is, the more information about physical criteria has. In fact, when the accuracy coefficient $|r| \geq 0.4$, P < 0.05, criteria is considered as accuracy enough and usable [9].
Factor analysis is a common name for a group of procedures that are used primarily to shrink and summarize data. In study, we can collect a large number of variables, and these variables are related to each other. In factor analysis, each criteria is considered as an *independent variable*.
Factor analysis is able to specify factors that can explain correlations in a group of variety variables, specify a factor or a group of factors including some key variables from a group of variety variables. Which means, specify the specific factor for a group of variables [7].
In order to test the accuracy of tests, this study conducting factor analysis [7], the physical evaluation criteria of visually impaired students are:
Object of research in this accuracy test are 30 visually

impaired male students of Nguyen Dinh Chieu High Special High School. The program is used to perform factor analysis is IBM SPSS Statistics 20.0. The results are shown in Tables 3 and 4.

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.664
Bartlett's Test of Sphericity	Approx. Chi-Square	38.153
	df	21
	Sig.	.012

KMO (Kaiser-Meyer-Olkin) test results and Bartlett's Test in Table 3 on the suitability of factor analysis showed that the factor analysis in this study is appropriate (KMO > 0.5, sig. < 0.05).

Table 4: Component Matrix[a]

Criteria	Component	Sig
Running 10m (second)	.812	<0.05
Hand squeeze force test (KG)	-.762	<0.05
Standing long jump (cm)	-.658	<0.05
Standing and bending forward (cm)	.613	<0.05
Running 300m (second)	.598	<0.05
Hands clapping in 10 seconds (times)	.567	<0.05
Throw ball hit the target (point)	.413	<0.05

Table 4 shows the correlation coefficients between the criteria with the main factor (physical), all 7 criteria have a accuracy coefficient with physical factor r > 0.4 and sig <0.05. That means, all 7 criteria are accuracy for the physical of student. In particular, criteria with the highest accuracy is running 10m (second) (0.812), while criteria with the lowest accuracy is Throw ball hit the target (point) (0.413).
Through three steps, which arr document synthesis, interview, reliability and accuracy test, 11 physical evaluation criteria have been specified for visually impaired students of Nguyen Dinh Chieu special high school in Ho Chi Minh City. They are: Standing height (cm), BMI (kg/m^2), 10m sprint (second), Standing long jump (cm), Hand squeeze force test (KG), Standing and bending forward (cm), running 300m (second), Hands clapping in 10 seconds (time), Throw ball hit the target (point), Heart function (HW), Capacity of the lungs (ml).

4. Conclusions
The research results show the following conclusions:
Having specified 11 reliable and accuracy criteria for physical evaluation for visually impaired students of Nguyen Dinh Chieu special high school in Ho Chi Minh City are:
Shape (5 criteria): Standing height (cm), weight (kg), BMI (kg/m^2), Quetelet (g/m), Hirtz Index (cm).
Functional (2 criteria): Heart function (HW), Capacity of the lungs (ml).
Physical (9 criteria): 10m sprint (second), 30m sprint (second), Standing long jump (cm), Hand squeeze force test (KG), Standing and bending forward (cm), Running 300m (second), Running in 5 minutes depending on the stamina (m), Hands clapping in 10 seconds (time), Throw ball hit the target (point).

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