

15. Prosiding_ The Development Of The Model For Artistic Gymnastics

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THE DEVELOPMENT OF THE MODEL FOR ARTISTIC GYMNASTICS TALENT SCOUTING ON EARLY CHILDHOOD

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ABSTRACT

This research aimed at producing an instrument for artistic gymnastics talent scouting on early childhood, which is practical, valid, and reliable in the form of a handbook and Compact Disc (CD) of instructions for talent scouting as well as software of artistic gymnastics talent on an early childhood.

This is a research and development through the stages of research and produces a product. The samples for the trial on a small group were 60 children of Grade I and II of Elementary School, while the samples for the trial on the large group were 392 children. Research variables included components of anthropometry and biomotor. Data analysis included the validity test, reliability test, normality test, and weighting using Exploratory Factor Analysis (EFA) and data analysis to establish the norm of talent categories.

Results of the study are as follows: Test results on the small group, the correlation between data obtained with the expert judgement, the results being obtained were evaluated and stated to be viable. The results on the large group are as follows. The anthropometry validity tests were all valid ($p < 0,05$). The biomotor validity tests were all valid ($p < 0,05$) except for the split ($p > 0,05$) stated to be fall. Later, split tests were not included. The reliability test of the anthropometry and biomotor instruments were stated to be reliable above 0,6 and the normality test indicated the normal data distribution. Based on the results of the Exploratory Factor Analysis (EFA) value of communalities shows the weighting percentage of each item. The norm of talent consists of five categories, namely very talented, gifted, talented enough, less talented, and not talented. Products being produced include the handbook with a Compact Disc as guidelines as well as software of gymnastics talent on early childhood to facilitate users in entering data and determining the talent category.

Keywords: Anthropometry, Biomotor, Talent, Gymnastics.

INTRODUCTION

Gymnastics is a kind of sport that needs the strength and speed demanding the anaerobic capacity and a high level of flexibility to produce a successful performance (Bradshaw, 2010 in a study conducted by Arazi, Faraji, and Mehrtash, 2012). Thomas, Wilson, and Bradshaw (2013) suggest that the identification of talent in gymnastics is widely used to select children who have potential talent to make achievements in this sport. Londeree (1990) in Thomas et al (2013) suggests that in identifying potential talented children, the original talent should be based on things that are associated with assessment of congenital factor or individuals' genetically quality, which is the most suitable for the gymnastics sport, but on the understanding that other non-genetic components can be improved through practice. Bompa (2009) states that for the artistic gymnastics sport, the age to start the training are female at the ages of 6-8 and male at the ages of 8-9, specialization stages are between ages of 9-10 for female and 14-15 years for male, while for the performance are 14-18 for female and 22-25 years for male. Next Bompa (2015) adds that female can start gymnastics sports at an early age i.e. at the age of 6-8 and male at the age of 8-9.

Based on the background and scope of the research above then there are problems that can be formulated, namely: How is the development of artistic gymnastics talent scouting model on early childhood related to norms of anthropometry measurement, norms of biomotor test, and norms of talent categories which is valid and reliable? This research aimed at producing a product of model for artistic gymnastics talent scouting on early childhood related to norms of anthropometry measurement, norms of biomotor test, norms of talent category, which is practical, valid, and reliable, with a CD (Compact Disc) and software of artistic gymnastics talent on early childhood. Development of a talent scouting model that would be developed as the following; components of the anthropometry including weight (kg), height (cm), sitting height (cm), arm span (cm), long limbs (cm), chest circumference (cm), hip circumference (cm) and BMI (the calculation employs WHO software). Biomotor components include sit and reach (cm), split (cm), bridge posture (cm), balance (second), push-up (seconds), sit-up (seconds), chin-up (seconds), standing broad jump (cm), and T-Test (seconds).

RESEARCH METHOD

This research and development generates products/instruments of guidance for artistic gymnastics talent scouting on early childhood, and test the effectiveness of the instrument (Sugiyono, 2004). The first trial was conducted for the small group of subjects of 60 males and females on May 9, 2015, while the second trial was conducted for the large group of subjects of 392 children on May 25, 2015.

The first instrument was discussed in FGD (Focus Group Discussion) as the validation. An evaluation was conducted on the advantages and disadvantages of the product. The trial results on the small group were correlated with the value of the expert judgement through the type of motoric movement test, namely the movement of constant, forward roll, forward bent, and then the advantages and disadvantages of the instrument were evaluated. A trial on the large group used instrument that has been improved. The first step was the initial data entry and then the T-score of each test item was computed. The results of the data were then analyzed to find out the validity and reliability. While the normality test employed the Kolmogorov Smirnov to see whether the existing data had a normal distribution. The next step of weighting the artistic gymnastics talent on early childhood was using Exploratory Factor Analysis (EFA).

RESULTS AND DISCUSSIONS

On a trial on the small group of the anthropometry measurement and the biomotor test, all items were stated to be valid ($p < 0.05$). The reliability test used the coefficient of Alpha Cronbach on the anthropometry measurement as well as the biomotor tests, all were stated to be reliable with the alpha coefficient above 0,6 meaning that the level of the reliability was high.

The next step was the trial on the large group. The validity test on the large group was correlating between the indicators with the total, of which first data was converted into a T-Score. The validity results of the anthropometry measurement of all items were stated to be valid with $p < 0.05$. On biomotor tests there was one item stated to be fail, i.e. split with $p > 0.005$ later the split was not included. On the reliability test of the anthropometry measurement and the biomotor test, everything were stated to be reliable above 0.6. The normality test of the data distribution used the Kolmogorov Smirnov Z, the anthropometry measurement and the biomotor test showed a normal data distribution. The norm standard of the anthropometry measurement and the biomotor test can be seen in the following table.

Table 1. Scoring Norm of the Measurement Results and Test

No	Norm T-Score	Types of Test and Measurement		Score
		Male	Female	
1.	> 65	Score distribution can be seen in the following table	Score distribution can be seen in the following table	5
2.	56 s/d 65			4
3.	46 s/d 55			3
4.	36 s/d 45			2
5.	< 36			1

Scoring Norm of the measurement results and the distribution test are as follows.

Table 2. Scoring Norm of the Sitting Height and Arm Span

No	Sitting Height		Arm Span	
	Male	Female	Male	Female
1.	> 72,8	> 73,1	> 138,50	> 138,50
2.	69,2 – 72,8	68,9 – 73,1	131,51 – 138,50	131,51 – 138,50
3.	64,7 – 69,2	64,3 – 68,8	124,51 – 131,50	123,51 – 131,50
4.	60,1 – 64,6	59,9 – 64,2	118,00 – 124,50	117,00 – 123,50
5.	< 60,1	< 59,9	< 118,00	< 117,00

Table 3. Scoring Norm of the Long Limbs and Chest Circumference

No	Long Limbs		Chest Circumference	
	Male	Female	Male	Female
1.	> 70,00	> 71,00	> 65,50	> 65,50
2.	65,51 – 70,00	66,01 – 71,00	61,51 – 65,50	61,51 – 65,50
3.	60,51 – 65,50	61,51 – 66,00	57,51 – 61,50	56,51 – 61,50
4.	56,00 – 60,50	57,50 – 61,50	53,50 – 57,50	52,51 – 56,50
5.	< 56,00	< 57,50	< 53,50	< 52,51

Table 4. Scoring Norm of the Hip Circumference and BMI

No.	Hip Circumference		BMI	
	Male	Female	Male	Female
1.	> 72,0	> 73,0	> 17,17	> 17,31
2.	66,6 – 72,0	67,9 – 73,0	15,03 – 17,17	15,17 – 17,31
3.	61,1 – 66,5	62,1 – 67,8	13,05 – 15,02	12,80 – 15,16
4.	56,0 – 61,0	56,5 – 62,0	11,01 – 13,04	10,58 – 12,79
5.	< 56,0	< 56,5	< 11,00	< 10,58

Table 5. Scoring Norm of the *Sit & Reach* and *Bridge*

No	<i>Sit & Reach</i>		<i>Bridge</i>	
	Male	Female	Male	Female
1.	> 38,50	> 38,50	< 8	< 10
2.	33,51 – 38,50	34,51 – 38,50	8,0 – 20,5	10,0 – 22,0
3.	28,51 – 33,50	29,51 – 34,50	21,0 – 33,5	24,0 – 36,5
4.	23,51 – 28,50	25,51 – 29,50	34,0 – 45,0	37,0 – 50,0
5.	< 23,51	< 25,51	> 45,0	> 50,0

Table 6. Scoring Norm of the *Balance* and *Push Up*

No.	<i>Balance</i>		<i>Push-Up</i>	
	Male	Female	Male	Female
1.	> 4,42	> 4,82	> 26	> 28
2.	3,33 – 4,42	3,48 – 4,82	20 – 26	22 – 28
3.	2,14 – 3,32	2,14 – 3,47	14 – 19	14 – 21
4.	1,00 – 2,13	0,84 – 2,13	8 – 13	6 – 13
5.	< 1,00	< 0,84	< 8	< 6

Table 7. Scoring Norm of the *Sit Up* dan *Chin Up*

No.	<i>Sit-Up</i>		<i>Chin-Up</i>	
	Male	Female	Male	Female
1.	> 24	> 18	> 13,68	> 11,36
2.	17 – 24	14 – 18	9,73 – 13,68	7,89 – 11,36
3.	10 – 16	9 – 13	5,55 – 9,72	4,46 – 7,88
4.	3 – 9	3 – 8	1,37 – 5,54	0,87 – 4,45
5.	< 3	< 3	< 1,37	< 0,87

Table 8. Scoring Norm of the *Power* and *Agility*

No.	<i>Power</i>		<i>Agility</i>	
	Male	Female	Male	Female
1.	< 149	> 135	< 12,95	< 14,27
2.	132 – 149	119 – 135	12,95 – 14,82	14,27 – 16,26
3.	113 – 131	102 – 118	14,83 – 16,63	16,27 – 18,29
4.	94 – 112	86 – 101	16,64 – 18,41	18,30 – 20,22
5.	< 94	< 86	> 18,41	> 20,22

Weighting of each item employed the factor analysis (Exploratory Factor Analysis/EFA) through some requirements such as the appropriateness of the model, the matrix of anti-images, value of communalities, matrix components, eigenvalue and factor loadings. Based on this factor analysis, then the weighting of the communalities values are obtained as follows.

Test Assessment Weight of the Artistic Gymnastics Talent Scouting on Early Childhood

No.	Indicator/Test	Communalities	Weight
1	Sitting Height	0.723	11.4
2	Arm Span	0.555	8.8
3	Long Limbs	0.608	9.6
4	Chest Circumference	0.686	10.8
5	Hip Circumference	0.766	12.1
6	BMI	0.437	6.9
7	Sit & Reach	0.291	4.6

8	Bridge	0.339	5.4
9	Push-up	0.098	1.5
10	Sit-up	0.303	4.8
11	Chin-up	0.390	6.2
12	Power	0.522	8.2
13	Agility	0.408	6.4
14	Balance	0.210	3.3
Total		6.336	100.0

Score on each test has a range between 1 to 5, then is multiplied by the weigh of each test, the final score remains having a range between 1 and 5, hence the norm of talent categories can be listed as follows:

**Talent Categories of Artistic Gymnastics on Early Childhood
Through the Anthropometry Measurement and Biomotor Test**

No	Norms of Talent Category	Category
1.	4,21 – 5,00	Very Talented
2.	3,41 – 4,20	Gifted
3.	2,61 – 3,40	Talented
4.	1,81 – 2,60	Less Talented
5.	1,00 – 1,80	Not Talented

In addition to the Handbook and CD of the instructions of measurement and test implementation, this study also produced the talent software that will help users to determine the artistic gymnastics talent on early childhood. Some of the strength of this product of artistic gymnastics talent scouting model on early childhood resulted in this study are, the existence of a Focus Group Discussion (FGD) with the material experts, expert judgement, validity and reliability, the guidelines of scouting talent and Compact Disc (CD), tests and measurements are easy (reasonable, not exhausting and spared from injuries as well as safe to use), the small and large group trials and a new product design completed with its specifications as well as the software to make it easier to determine the talent category. The aspects of the efficiency and effectiveness of the product are; (a) a good selection process will ensure that the children being selected are the talented ones, especially seen in terms of morphological, physiological and movement ability. Therefore, all efforts in training will be comparable to the achievements in the future, and (b) the existence of this product reduces the expense (the cost of coaching), achievements will be quickly reached, training will be more efficient, more focused yet will not be wasteful.

CONCLUSION

Summary in this study is the construction of the handbook and CD of instructions of the measurement and test implementation of the artistic gymnastics talent scouting on early childhood which is practical, valid and reliable enclosed with the talent software that makes it

easy for users in determining the talent level in the artistic gymnastics talent scouting on early childhood.

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