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FACTOR ANALYSIS OF STRENGTH POINTS OF PHYSICAL EDUCATION COURSES IN KHUZESTAN HIGH SCHOOLS FROM TEACHERS' VIEWPOINT

Key words: factor analysis, strength points, physical education course, Khuzestan.

ABSTRACT

Physical education in high school plays an important role in the development of students' physical, mental and social health. The aims of the present study were identification and factor analysis of strength points of physical education in high schools from Khuzestan, Iran from teachers' viewpoint. The study sample comprised 328 high school PE teachers from Khuzestan, 315 of whom completed a questionnaire. The instrument for data collection was a self-made questionnaire containing 62 items designed in consultation with an expert statistician and a physical education specialist. The questionnaire reliability was 0.91. The factor analysis revealed 62 items with strengths points divided into four factor groups: a) managerial and intramural – 22 items (eigenvalue of 34.87); b) educational – 17 items (3.36); c) scientific – 12 items (2.60); d) hygienic and health – 11 items (1.65). These results show that physical education is an important component of high school curriculum and has a strong, positive effect on students' health. They also show that those who adopt healthy lifestyle patterns early in their life tend to follow them later on.

INTRODUCTION

Education is considered one of the most important and fundamental elements of development of society's potential talents. Education involves all-around physical, cognitive, social and ethical training of students aimed at their versatile development, and brings them as close to moral and human excellence as possible [1]. A special place in all education systems should be reserved for motor training and exercise programs [6]. The characteristics of physical education classes and their impact on different aspects of students' development make them distinct from other school courses. Effective organization and achievement of objectives of physical education courses in schools can improve the role of physical education and

sports in society at large [8]. Nowadays, physical education programs are regarded as elements of the infrastructure of the education system, and along with achievements of medical sciences, biology, sociology and psychology, they play a fundamental role in maintaining the health of a community [21].

The special objectives of physical education and sports are primarily educational ones within the mental-motor, cognitive, and emotional domains. Behavioral objectives of physical education in schools should be developed and set using existing facilities and conditions and be accessible via motor and sport programs and activities [6, 7]. In addition, they should be consistent with characteristics and needs of individual students. Physical education in schools is also important since the development of community sports starts with school educational

programs, which then lead to citizens' involvement in public, recreational, club and championship sports [5]. Children and teenagers who have successfully passed motor development and sport training stages during their twelve years of educational experience, follow healthy behavior patterns and are active in various social areas in their adult life [2, 6].

Currently, most Japanese, Chinese and Korean Olympic and world champions have been products of school sport and physical education programs. Furthermore, a greater focus on physical education and sports in high school leads to reinforcement and development of public sports [9].

In 1927 the Iranian Parliament passed a law which made physical education a compulsory part of the school curriculum for all students. According to the bill, one hour every weekday was to be devoted to physical exercises in school. The law was, however, poorly implemented due to the unavailability of equipment and administrative facilities at that time. Ultimately, it failed due to the lack of specialized manpower, possibilities and spaces.

Most of research studies into school physical education have been descriptive and presented students', teachers' and managers' viewpoints on the issue yielding similar results. Despite deficiencies and administrative problems, the research still emphasizes the positive role of physical activities and sport in childhood and adolescence [9, 14]. Regular participation in sports activities helps develop students' motor skills, social skills and creativity. Researches, for example, showed a relationship between cognitive-motor abilities and educational performance of girl students in the fifth grade [16].

Studies on physical education and sport courses in school in Western countries point to the 1950s as a crucial period of development. Especially in the United States, a great number of studies in the areas of physical fitness and health of adolescents and young adults were published at that time [11, 12].

Research has shown that physical activity affects the secretion of growth hormone. Sports and physical activities cause an increase in bone density and strength, improve cognitive abilities as well as pulmonary and cardiovascular function in children and adolescents [17]. The relationship between participation in PE classes and educational performance of high school students has been also

subject to extensive research and its results have indicated a significant relationship between educational performance and sports activities. Better school grades have been shown to be attained by students from school programs with more hours of physical activities. Various studies have also revealed a significant positive relationship between physical fitness and general educational performance of school students. Research on primary school children has shown that sport and physical activity can be used to enhance students' learning and educational performance.

The World Health Organization (1998) emphasizes that schools greatly contribute to students' healthy growth and development of health behaviors. Basic physical exercises aimed at development of physical and mental health constitute an important issue during school education, and are crucial determinants of development of active and healthy lifestyles, as institutionalized behavioral patterns in childhood are often preserved in adulthood. The activities of UNESCO (2001) also focus on the close relationship between sports and education. According to a UNESCO report regarding the attitude of students to sporting events, a major part of school curriculum should be devoted to exercises [9, 11]. In addition, the report considers exercise to be a useful tool for teaching social skills [4]. Considering the necessity of high quality physical education programs in schools, a report from the Seminar of Preparing Standards of Student Sport Programs stipulates that physical activities raise students' self-confidence and feeling of well-being and improve brain function and educational performance. Physical fitness increases students' educational success, and the feeling of joy and freshness after physical activities leads to continuing activities [7, 8].

The aim of the present study was to identify the strengths of implementation of the objectives of a physical education course from the perspective of high school physical education teachers of the Khuzestan Province using factor analysis, and to answer the following questions: 1) What are the factors related to strength points of implementing the objectives of physical education courses in high schools of the Khuzestan Province? 2) How can the strength points of implementing the objectives of high school PE courses in the Khuzestan Province be categorized? The study can help improve the organization of programs of physical education

departments in the province through identifying and prioritizing the strengths of implementing objectives of secondary school PE courses.

METHODS

The study sample comprised PE teachers (139 women and 189 men) working in various high schools in the Khuzestan Province in Iran in the school year of 2008-2009. The instrument for gathering data was a self-made questionnaire consisting of 62 items regarding strength points of physical education school courses. Other research tools used in the analysis included literature review and teachers' job descriptions. The descriptive research tools included information on implementation of different PE courses with all the positive and negative sides. The research procedure was based on factor analysis and consisted of four stages:

Stage 1: A questionnaire containing an open question about strength points of objectives of physical education courses was provided for 30 teachers and experts. In addition, through individual interviews, opinions about the strength points were collected from 15 lecturers of the faculty of physical education.

Stage 2: On the basis of information obtained from Stage 1 and consultations with a specialist regarding factor analysis methodology, a 75-item preliminary questionnaire was prepared and presented to 30 physical education teachers and experts from Ahvaz. At the end of the questionnaire, they were asked to write their comments concerning any ambiguities in the questionnaire or suggestions for removal or addition of items.

Stage 3: A final questionnaire containing 62 items was developed. Its statistical validity and reliability were determined by four specialists holding Ph.D. in physical education.

Stage 4: The final questionnaire was sent to 328 PE teachers from different high schools from the Khuzestan Province. 315 questionnaires were completed and returned. To facilitate the process of distribution and collection of questionnaires, the 38 educational districts of the Khuzestan Province were divided into five areas (northeast, northwest, southeast, southwest and central). The reliability and internal consistency of the questionnaire items were checked with Cronbach's alpha and the bisection method, and they amounted to 0.97 and

0.91, respectively. Also, the construct validity of the questionnaire was calculated with the use of correlation coefficient and equaled 0.68. The respondents gave their answers on a five-level Likert scale (very low, low, medium, high and very high). Descriptive statistics were used to describe the variables, the correlation coefficient to assess questionnaire validity, Cronbach's alpha coefficient and the bisection method to determine the validity of questionnaire; and factor analysis to extract and identify factors from 62 items.

RESULTS

The obtained research results were grouped in two sections: (1) descriptive characteristics of strength points declared in the questionnaire; and (2) factor analysis results for identification of strength points.

Descriptive characteristics of questionnaire items:

Table 1 shows the frequency distribution of a questionnaire item. For example, out of 315 answers to item 1, 11 were "very low", 26 "low", 113 "moderate", 88 "high", and 77 "very high". The frequency distribution was calculated for all 62 items in the questionnaire.

Table 1. Frequency distribution of item 1 of the Strength Points Questionnaire

Level	Frequency	Frequency %	Cumulative Frequency Percent
Very Low	11	3.5	3.5
Low	26	8.3	11.7
Medium	113	35.9	47.6
High	88	27.9	75.6
Very High	77	24.4	100.0
Total	315	100.0	

Factor analysis of strength points:

On the basis of the respondents' answers the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was calculated at nearly 0.97. Serine and Kaiser believe that implementation of factor analysis should be permitted only when the KMO value is greater than 0.60 [3], i.e. the higher KMO

above 0.60, the better suitability and adequacy of a sample. The KMO result confirmed the adequacy of the questionnaire.

It is essential that variables must be correlated with each other as otherwise there is no reason for implementing and explaining a factor analysis [3]. The factor analysis infrastructure was then examined through Bartlett's T test of sphericity, whose value amounted to 22562.76 at the level of statistical significance of 0.001. The results of the KMO test and Bartlett's T test of sphericity for strength points are presented in Table 2.

Table 2. Results of confirmation tests (KMO & Bartlett) for strength points items

Test	Quantity
Sampling adequacy measurement (Kaiser-Meyer-Olkin)	0.973
Bartlett's test of sphericity	22562.76
Statistical significance level	0.001

Thirdly, a scree test determining the number of extractable factors was carried out (Table 3). The scree test revealed that with regard to eigenvalues (i.e. total factor coefficient squares of items available in each factor) four groups of factors could be extracted from the 62 questionnaire items: Factor Group 1 (22 items with the eigenvalue of 34.87), Factor Group 2 (17 items, 3.36), Factor Group 3 (12 items, 2.60) and Factor Group 4 (11 items, 1.65). Furthermore, the percentages of variances explained in the four groups of factors were calculated at 56.24, 5.42, 4.20, and 2.67, respectively.

Table 3. Scree test results in four groups of factors of strength points

Factors	Number of items	Eigenvalue	Determined percent of variance
Factor Group 1	22	34.87	56.24
Factor Group 2	17	3.36	5.42
Factor Group 3	12	2.60	4.20
Factor Group 4	11	1.65	2.67

Table 4. Results of factor loading of items in the four groups of factors identified in factor analysis

Factor Group 1		Factor Group 2		Factor Group 3		Factor Group 4	
Factorial load	Item number	Factorial load	Item number	Factorial load	Item number	Factorial load	Item number
0.821	60	0.738	7	0.720	34	0.786	23
0.815	59	0.728	6	0.683	35	0.749	25
0.814	61	0.721	6	0.674	30	0.736	24
0.811	58	0.701	4	0.667	33	0.682	22
0.797	56	0.699	10	0.666	31	0.681	26
0.794	57	0.695	11	0.655	32	0.675	28
0.789	62	0.691	9	0.572	36	0.657	27
0.730	54	0.673	2	0.544	41	0.627	29
0.661	55	0.665	1	0.531	43	0.607	20
0.631	52	0.655	3	0.525	42	0.598	21
0.615	53	0.651	12	0.514	17	0.572	19
0.612	48	0.633	13	0.474	39		
0.611	50	0.631	8				
0.596	51	0.631	14				
0.594	46	0.598	16				
0.588	49	0.458	15				
0.579	45	0.423	18				
0.577	47						
0.545	44						
0.544	37						
0.509	40						
0.460	38						

Following these results, item 60 in the questionnaire (determining adequacy of sports facilities in the province's schools) with the maximum factor weight (0.821), and item 18 (flexibility of teaching methods with regard to geographic features and limited facilities of the area) with the minimum factor weight (0.423), set the maximum and minimum values of the test's variance. The results of factor analysis and factor weights for each factor of the questionnaire are presented in Table 4.

DISCUSSION

Physical education and sport in school are an important curricular component of the educational process of children and adolescents. The benefits of good levels of physical fitness and mental health are considered prerequisites for addressing educational, training and research issues by the students. The educational objectives of physical education in the cognitive, socio-emotional and psycho-motor spheres can only be achieved through educational review, purposefulness, planning and use of curriculum [22]. The groups of factors extracted in the present study by way of factor analysis from the questionnaire on strength points can be classified as:

- intramural and managerial – 22 items (Factor Group 1);
- educational – 17 items (Factor Group 2);
- scientific – 12 items (Factor Group 3);
- health – 11 items (Factor Group 4).

Theoretical studies and background research have also shown that school PE classes play a fundamental role in various areas of adult sport life including public sport, recreational sport and even sports competition at a championship level. Countries with the highest medal rankings pay special attention to the development of school sports, sports centers, extracurricular sport activities, interschool sports competitions, sports teams, and finally, to discovering sports talents. Therefore understanding various sports skills and reviewing training methodology are considered to be the main requirements for teachers and coaches of school sports. In addition, promotion of the scientific and practical development of teachers, their further education as well as school principals' support and cooperation also contribute to the role of physical activity and sport in schools. It seems

that creating a positive attitude in students is the most difficult and most important task of physical education coaches and teachers in schools, because shaping students' attitudes makes them pursue healthy behaviors and sports, and leads to their participation in sports on a higher level (such as public, recreational and championship sports) in the future.

These results are compatible with findings of [4, 6, 7, 8, 12, 14, 15, 16, 19, and 20] as they all observed that contemporary physical education should be viewed from a much wider and more scientific perspective. These studies demonstrate the importance and the role of schools to enable the students to enjoy sport classes in school on a regular basis. Schools are in a unique position to increase students' physical fitness; and development of life-long physical activities and fitness should be the ultimate goal for students.

Finally, it should be emphasized that investment in physical education in schools is, indeed, an investment in the country's sport future. Developing the awareness of the critical role of families, managers and officials is very important for promoting physical education and sports programs inside and outside the school community. Furthermore, helping students find opportunities to be active and lead an active lifestyle will be an effective means against growing passiveness caused by mechanization of life and technological developments.

Developing educational objectives and better contents of teaching curricula as well as objective and reliable evaluation methods will improve students' performance and bring desirable changes in them. It can also motivate them to participate in sports activities. Enjoying the physical, mental, social, and moral effects of physical education leads to an improvement in the personal and social quality of life. The ways to attain organizational objectives of education should be then well-prepared.

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