

Research on the Theoretical Model of Physical Education Evaluation in Colleges and Universities Based on SEM

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Abstract—The ultimate goal of physical education is to make students take an active part in physical activities. In this paper, the author tests the structural equation model (SEM) with students' interest in physical education class (PE class), teaching satisfaction, teaching input and consciousness of continual exercise. The result reveals that the structural model of students' interest in PE class, teaching satisfaction and consciousness of continual exercise, and that of students' interest in PE class, teaching input and consciousness of continual exercise are reasonable; but students' interest in PE class will not directly affect their consciousness of continual exercise; only when students are satisfied with the teaching and get themselves involved into the PE class due to their interest in PE class can such interest have an impact on students' consciousness of continual exercise. Therefore, the theoretical model of physical education evaluation established in this research is reasonable.

Keywords—*interest in PE class; teaching satisfaction; teaching input; consciousness of continual exercise*

I. INTRODUCTION

Physical education plays an important role in carrying out nationwide fitness activities and accelerating the construction of a sports power, and it is the foundation of sports power. Physical education can not only improve students' health, but also a part of quality-oriented education characterized by all-round development of students' morality, intelligence and physique. Physical activities can stimulate the vitality of school life and social life, thus improving students' life quality. Therefore, the established sports values and way of act will directly affect the action factors important for China to develop towards a sports power.

As an important approach to realize quality-oriented education and all-round development of talents, physical education shall follow the law of physical and mental development and interests of college students, focus on the goal of enhancing students' physique and physical health and improving their social literacy through physical education, and lay a solid foundation for students' lifelong physical exercise. Physical education is an important link between school physical education and social physical education, and an important link in the implementation of sports power strategy, which has obvious influence and long-term benefit to the

realization of sports power. Therefore, in the physical education reform, it has become the trend of physical education in the new era to strengthen interest factors of physical education and arouse students' consciousness of autonomous and active participation in physical activities.

Allport, a personality psychologist, pointed out that interest is people's psychological tendency to know something or engage in some activity by contacting with such a thing or activity. It is based on the need to know and explore things outside, and it is an important motivation for people to know things and explore the truth. Some interests are formed by individuals over a long period of time in their lives and some are accidentally inspired by a certain thing in the right context. Sports interest is the driving force for students to take an active part in physical exercise, and also the premise of promoting students to study independently and keep exercising. In physical education, interest is the condition that stimulates students to participate in sports activities, enrich their spare time, cultivate team spirit, harmonize interpersonal relationship and form good living habits. Both the selection of teaching content and the reform of teaching method in physical education should pay attention to students' interest factors to ensure PE classes are able to stimulate students to develop interest in sports, and to actively participate in physical exercise, which will improve teaching input and teaching satisfaction, as well as strengthening students' consciousness to keep participating in physical exercise. In this way can physical education contribute to training socialist builders and successors characterized by all-round development in morality, intelligence, physique and aesthetics.

Satisfaction refers to a sense of pleasure psychologically after people's needs have been met, which is based on the relative comparison between the actual feeling and the expectation, and the quantified psychological state by some means is called degree of satisfaction. Satisfaction with PE class is the feeling or attitude of students towards PE learning activities, which directly determines the degree of students' expectation achieved in the learning process, and is also an important evaluation index for the effect of school physical education teaching. Sports input, with the purpose of developing sports, refers to sports behaviors of the government, units and individuals within the scope of non-sports major, and

the process of they participating, enhancing, strengthening and contributing to sports development. Learning engagement refers to the state in which an individual has abundant energy and mental toughness in learning, can recognize the significance of learning, is enthusiastic about learning, and thus get immersed in the learning.

Sports participation is a kind of conscious and planned sports behavior people carry out through physical exercise, recreation, or bodybuilding in order to achieve physical and mental health, enrich cultural life, and enhance emotional and social communication, etc. The continual participation behavior refers to the continuous participation in situated learning and identity construction related continual participation acts. Therefore, the consciousness of continual exercise is the behavioral manifestation of the intention of sports participants to participate in sports activities in their spare time. It is necessary to increase PE class input, enhance students' satisfaction with PE teaching, strengthen teaching guidance function, and improve PE teaching environment.

II. RESEARCH OBJECT AND METHOD

A. Research Object

Stratified cluster sampling survey was conducted on students from colleges and universities of Liaoning Province, Jilin Province and Heilongjiang Province. A total of 1,200 questionnaires were issued and 1,154 were recovered, with a returns-ratio of 96.2%. Among them, there were 191 (15.9%) freshman and 189 (15.6%) sophomores from Liaoning Province, 194 (16.2%) freshman and 196 sophomores (16.4%) from Jilin Province, 187 freshman (15.6%) and 197 sophomores (16.5%) from Heilongjiang Province.

B. Research Method

1) *Literature*: By consulting relevant literature on the PE theory reform, students' interest in PE class, teaching input, teaching satisfaction, and consciousness of continual exercise in colleges and universities, the author summarized the causal relationship between students' interest in PE class and research variables, and designed the questionnaire.

2) *Research tools*: The questionnaires employed were composed of scale of interest in PE class, teaching input scale, teaching satisfaction scale and scale of consciousness of continual exercise. Among them, the scale of interest in PE class includes 11 questions covering three dimensions; the teaching input scale includes 28 questions covering four dimensions; the teaching satisfaction scale includes 12 questions covering three dimensions; the scale of consciousness of continual exercise includes 2 questions covering two dimensions. The five-point Likert scale was employed.

3) *Analysis of questionnaire validity and reliability*: In this research, factor analysis based on principal component analysis was used for validity verification. After the analysis, the scale of interest in PE class is KMO=.887; teaching input KMO=.912; teaching satisfaction KMO=.895; consciousness of continual exercise KMO=.952, indicating that the variables are suitable for factor analysis. Cronbach's α coefficient was used for reliability analysis, and the overall α coefficient of the scales was between .788 and .921, indicating a high overall reliability.

4) *Mathematical statistics*: For effective data processing and input, SPSS 19.0 and AMOS 20.0 programs were used for descriptive statistics, confirmatory factor analysis, correlation analysis and SEM verification.

III. RESULTS AND ANALYSIS

A. Correlation Analysis

Pearson product-moment correlation coefficient was used to test multicollinearity. The analysis results show that there is a correlation between the interest in PE class in all dimensions including social accomplishment, sense of achievement and health maintenance; the teaching input in all dimensions including purpose, content input, challenge and integration; the teaching satisfaction in all dimensions including course management, teaching guidance and teaching environment; the consciousness of continual exercise in all dimensions and the possibility of and the consciousness of continual exercise ("Table I").

TABLE I. CORRELATION ANALYSIS

Factors	1	2	3	4	5	6	7	8	9	10	11	12
Social accomplishment	1											
Sense of achievement	.551**	1										
Health maintenance	.539**	.585**	1									
Purpose	.218*	.343**	.268*	1								
Content input	.322**	.199*	.288**	.332**	1							
Challenge	.211*	.421**	.442**	.321**	.350**	1						
Integration	.569**	.511**	.466**	.429**	.299**	.333**	1					
Course management	.390**	.349**	.321**	.653***	.530**	.412**	.477**	1				
Teaching guidance	.408**	.380**	.358**	.312**	.249**	.311**	.297**	.442**	1			
Teaching environment	.374**	.339**	.212**	.346**	.215***	.381**	.438**	.342**	.299**	1		
Continual exercise probability	.603***	.662***	.599**	.463**	.221**	.555**	.299**	.448**	.332**	.677**	1	
Consciousness of continual exercise	.566**	.571**	.511**	.488**	.305**	.460**	.476***	.663***	.421**	.338**	.405**	1

^a *** p<.001 ** p<.01 * p<.05

B. Verification of Fit Measure of the Research Model

The goodness of fit index refers to the degree of consistency between the theoretical model and the actual data. The maximum likelihood method in AMOS 20 was used for parameter estimation, and the absolute fit index, comparative fit index and contracted fit index were used to judge the overall fit index of the hypothesis model.

As shown in “Table II”, the fit index Q of the research model is consistent with the fit measure of CFI, GFI, AGFI, RMSEA and RMR. The CFI is .977, GFI is .943, and AGFI is .919, which is greater than the standard value of .9, indicating that the hypothesis model is acceptable. According to the definition by Browne & Mels, the model RMSEA is .056, between .05 and .08, indicating an acceptable fit measure. The overall fit measure presented by the above results shows that the sample hypothesis model is acceptable.

TABLE II. OVERALL FIT INDEX OF THE MODEL

Index	χ^2 / df	NC	CFI	GFI	RMSEA	AGFI
Research model	4.77	4.39	.977	.943	.056	.919
Standard value	1~5	≤5	≥.9	≥.9	≤.08	≥.9

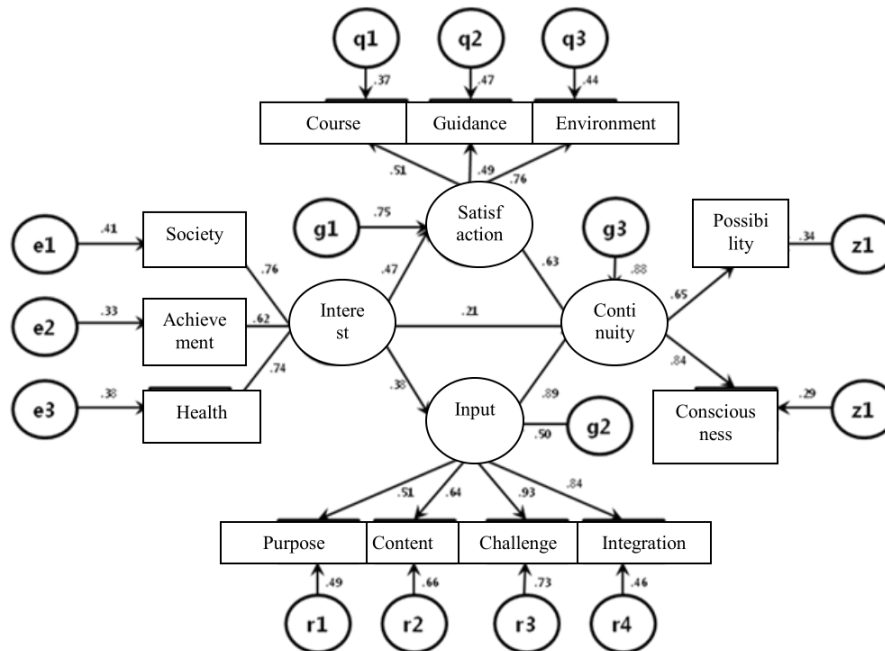


Fig. 1. Path diagram and normalized index of the research model.

C. Analysis of the Overall Fit Measure of the Hypothesis Model

The research model is an acceptable fit model, and the verification result of each hypothesis is shown in “Table III”.

TABLE III. VERIFICATION RESULTS

	Estimate	S.E	C.R	Verification Result
Interest in PE class → Teaching satisfaction	.47	.388	5.382	Adopted
Interest in PE class → Teaching input	.38	.446	2.964	Adopted
Interest in PE class → Consciousness of continual exercise	.17	.108	1.988	Rejected
Teaching satisfaction → Consciousness of continual exercise	.63	.062	9.874	Adopted
Teaching input → Consciousness of continual exercise	.89	.071	11.232	Adopted

TABLE IV. CAUSALITY BETWEEN MEASURED FACTORS OF THE RESEARCH MODEL

Factor	Direct Effect	Indirect Effect
Interest in PE class → Teaching satisfaction	.47	
Teaching satisfaction → Consciousness of continual exercise	.63	
Interest in PE class → Teaching satisfaction → Consciousness of continual exercise		.30
Interest in PE class → Teaching input	.38	
Teaching input → Consciousness of continual exercise	.89	
Interest in PE class → Teaching input → Consciousness of continual exercise		.34

"Table IV" shows the following aspects:

The interest in PE class has an impact on teaching satisfaction $\beta=.47$. This indicates that the higher the students' interest in PE class, such as social accomplishment, sense of achievement and health maintenance, the higher students' satisfaction with course management, teaching guidance and teaching environment will be.

The interest in PE class has an impact on teaching input $\beta=.38$. This indicates that the higher the students' interest in PE class such as social accomplishment, sense of achievement and health maintenance, the higher of students' input in purpose, content, challenge, integration etc.

The interest in PE class has no effect on consciousness of continual exercise $\beta=.17$. This indicates that the consciousness of continual exercise such as the possibility of and the consciousness of continual exercise are not affected by the interest factors such as social accomplishment, sense of achievement and health maintenance. Therefore, it is concluded that the interest in PE class has no effect on the consciousness of continual exercise.

The teaching satisfaction has an impact on the consciousness of continual exercise $\beta=.63$. This indicates that the higher the satisfaction factors such as course management, teaching guidance and teaching environment, the higher the possibility of and the consciousness of continual exercise will be.

The teaching input has an impact on the consciousness of continual exercise $\beta=.89$. This indicates that the higher the teaching input factors such as students' purpose, content input, challenge and integration, the higher the possibility of and the consciousness of continual exercise will be.

The interest in PE class has an indirect influence on the consciousness of continual exercise ($.47 \times .63 = .30$) through the teaching satisfaction.

The interest in PE class has an indirect influence on the consciousness of continual exercise ($.38 \times .89 = .34$) through the teaching input.

IV. CONCLUSION AND SUGGESTION

A. Conclusion

First, the interest in PE class has a positive impact on teaching satisfaction; second, the interest in PE has a positive impact on teaching input; third, the interest in PE has no effect on the consciousness of continual exercise; fourth, the teaching satisfaction has a positive impact on the

consciousness of continual exercise; fifth, the teaching input has a positive impact on the consciousness of continual exercise; sixth, the interest in PE class has an indirect impact on the consciousness of continual exercise through the teaching satisfaction; seventh, the interest in PE class has an indirect influence on the consciousness of continual exercise through teaching input. Therefore, the physical education evaluation model based on the interest in PE class, teaching satisfaction, teaching input, and consciousness of continual exercise is effective.

B. Suggestion

Physical education is the sprouting period of lifelong physical education, and it is necessary to strengthen interest factors in the process of physical education, so that students can participate in physical education more actively. In addition, it is necessary to provide students with a good teaching environment, rich and colorful teaching contents and diversified teaching methods, so as to improve students' satisfaction with PE class, get themselves involved in the PE class, and ultimately form the consciousness of continual exercise, and consolidate their active participation.

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