



A Developing Competency of High-School Physical Education Teacher Model in Eastern Guangdong Province

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Abstract

Background and Aim: With the development of the comprehensive reform of China's new college entrance examination, Guangdong province has proposed higher requirements for high school physical education teachers. The objectives of this research were: (1) To explore the components of competence of high school physical education teachers. (2) To construct the competency model of high school physical education teachers in eastern Guangdong. and (3) To propose the guidelines for developing competency of high school physical education teachers in eastern Guangdong.

Materials and Methods: This research was divided into three Phases: (1) Exploring the components of high school physical education teachers' competence. In this Phase, the literature, the in-depth interview of 15 experts, and the Delphi method of two rounds of consultation with 17 experts were adopted. (2) Questionnaire distribution and collection. The questionnaire was adopted. There were 1526 high school physical education teachers in Eastern Guangdong, and the sample size for this research was 308 according to Krejcie and Morgan's (1970) sampling table. (3) Data analysis: Descriptive Statistical Analysis, Exploratory Factor Analysis, and Confirmatory Analysis in mathematical statistics were used to analyze the collected data. Data analysis includes mean value, standard deviation analysis, and content analysis.

Result: (1) The competency model of high school physical education teachers in eastern Guangdong consisted of 9 dimensions and 38 variables. Namely, The RIC had six variables, IGC had four variables, TOS had five variables, SK had six variables, PC had five variables, IR had three variables, PQ had three variables, TSR had three variables, and PD had three variables. (2) 38 guidelines for developing competency of high school physical education teachers in eastern Guangdong were proposed from 9 dimensions.

Conclusion: (1) The competency model of high school physical education teachers in eastern Guangdong was composed of 9 dimensions and 38 variables. (2) There were 38 guidelines for developing competency of high school physical education teachers in eastern Guangdong.

Keywords: High School; Physical Education Teachers; Competency model; Eastern Guangdong Province

Introduction

The broader context of improving the quality of physical education in high schools. Physical education plays a crucial role in promoting students' overall health and well-being, and the competency of teachers in this domain is pivotal for achieving positive educational outcomes. The background of this research underscores the need for a specialized model that focuses on developing the competencies of high-school physical education teachers. The study recognizes that effective teaching in physical education requires a unique set of skills that goes beyond general teaching competencies, emphasizing the importance of domain-specific expertise in fostering students' physical and cognitive development.

On August 10, 2021, the Opinions on Comprehensively Strengthening and Improving School Health and Health Education in the New Era issued by the Ministry of Education of China focused on the construction of physical education teachers and pointed out that physical education teachers are important implementors of the implementation of various physical education policy documents. It highlights the key role of physical education teachers in physical education reform, and the establishment of a physical education teachers team has become the primary task to promote the smooth implementation of physical education reform.

High school physical education examination is an important part of the comprehensive reform of the new college entrance examination. Guangdong Province, as the third batch of comprehensive college entrance examination reform provinces, started to use it in the autumn of 2018 and implemented it in the 2021 general college entrance examination. The high school physical education examination adopts the way of "sports participation + physical health test + sports skill test". Among them, the content of the sports skills test is: choose 2 items from 6 categories of sports, such as track and field, swimming, gymnastics (aerobics), ball games (basketball, volleyball, football, table tennis,



badminton, tennis), martial arts, and skipping rope. The test items must be the core skills of the sports items. In the initial stage of the comprehensive reform of the new college entrance examination, Guangdong Province has proposed higher requirements for high school physical education teachers. Based on this, the research on the competence of high school physical education teachers helps improve the competence of high school physical education teachers, developing more comprehensive high school physical education teachers, and providing theoretical guidance and practical reference for the construction of excellent high school physical education teachers. At the same time, promote the reform of high school physical education, to further promote the comprehensive reform and development of the new college entrance examination.

This research builds upon existing literature that highlights the challenges and gaps in the preparation and professional development of high-school physical education teachers (Liu & Ayyildiz, 2019; Metzler, 2017). By delving into the specifics of competency development, the study aims to contribute valuable insights to teacher training programs and educational policies. The research background also emphasizes the broader implications of enhancing the competencies of high-school physical education teachers, such as the potential positive impact on students' physical literacy, engagement in physical activities, and long-term health outcomes.

Objectives

1. To explore the components of competence of high school physical education teachers.
2. To construct the competency model of high school physical education teachers in eastern Guangdong.
3. To propose the guidelines for developing competency of high school physical education teachers in eastern Guangdong.

Literature Review

A review of the literature found that there was no research on the competency model of high school physical education teachers and very little research on the competency model or structure of middle school physical education teachers.

Zhang (2011) divided the competence of middle school physical education teachers into five factors in the Model Construction and Empirical Research on the competence of middle school physical education teachers, namely, scientific research innovation ability, information collection, and learning ability, teaching and organizational ability, professional knowledge and personality characteristics. These factors constitute the core elements of physical education teachers' competence in middle school and provide an important reference and theoretical basis for further research and evaluation of physical education teachers' competence.

Ma (2011) pointed out eight key factors in his research on the competence of middle school physical education teachers, which together constitute the competence of middle school physical education teachers. These factors are ranked in order of importance as self-development awareness, teaching ability, control and adaptability, emotional characteristics, work quality awareness, dedication and love, professional ethics, and innovation awareness. By examining these factors, we can fully understand the abilities and characteristics of middle school PE teachers in different aspects, to assess their competency level more accurately. The definition of these factors provides important guidance and reference for the professional development and education quality improvement of middle school physical education teachers.

Meng (2014) put forward seven key indicators of physical education teachers' competence in the analysis of the current situation of physical education teachers' competence in middle schools in eastern Henan Province. These indicators cover many aspects and are helpful to comprehensively evaluate the ability and characteristics of middle school physical education teachers in the teaching process. The seven indicators are teaching skills, attention to students, interpersonal communication, career preferences, research learning and improvement, respect for students, and personal characteristics. Through the analysis of these indicators, we can better understand the education level and professional ability of middle school physical education teachers, to provide useful references for the improvement of education quality and teacher training.

Tang (2021) takes the competency of physical education teachers in rural middle schools of Yongzhou City as the research object and studies the competency status of physical education teachers in rural middle schools of Yongzhou City from five dimensions, namely, scientific research and



innovation ability, teaching and organizational ability, information collection and learning ability, professional knowledge and personality characteristics by using research methods, questionnaire survey, and mathematical statistics. This paper analyzes the problems existing in the competence of physical education teachers in rural middle schools in Yongzhou City and puts forward the optimization path and suggestions.

To sum up, there was no research on the competency model of high school physical education teachers, and very little research on the competency model or structure of middle school physical education teachers, which mainly covers knowledge, skills, attitudes, development characteristics, and so on. These researches provide some theoretical support and practical reference for the development of this research.

However, the development of competencies among high-school physical education teachers is a critical aspect of ensuring the effectiveness of physical education programs. Teachers in this domain require a unique skill set that encompasses not only pedagogical expertise but also a deep understanding of movement science, motor development, and strategies to engage students in physical activity. The research on "Developing Competency of High-School Physical Education Teachers" addresses this need by focusing on a comprehensive model that targets the specific competencies essential for high-quality physical education instruction.

The study emphasizes the multifaceted nature of competency development for high-school physical education teachers. This includes a mastery of instructional strategies that cater to diverse student needs, effective classroom management, and the ability to create an inclusive and positive learning environment. Furthermore, the research delves into the integration of technology and contemporary teaching approaches, recognizing the evolving landscape of education and the importance of adapting pedagogical practices to engage students in meaningful ways (McKenzie & van der Mars, 2015). By exploring these dimensions, the research seeks to contribute to the refinement of teacher training programs and the continuous professional development of high-school physical education educators.

The research also aligns with broader educational goals, acknowledging that physical education is not only about promoting physical activity but also fostering lifelong health and well-being. As such, the development of competencies among teachers is seen as a direct investment in the overall health literacy and lifestyle choices of students. The study recognizes the potential long-term impact of effective physical education instruction on reducing sedentary behavior, preventing chronic diseases, and promoting holistic student development (Centers for Disease Control and Prevention, 2020). The research on developing competencies thus serves as a valuable contribution to the ongoing discourse on the role of physical education in shaping healthier and more active communities.

Conceptual Framework

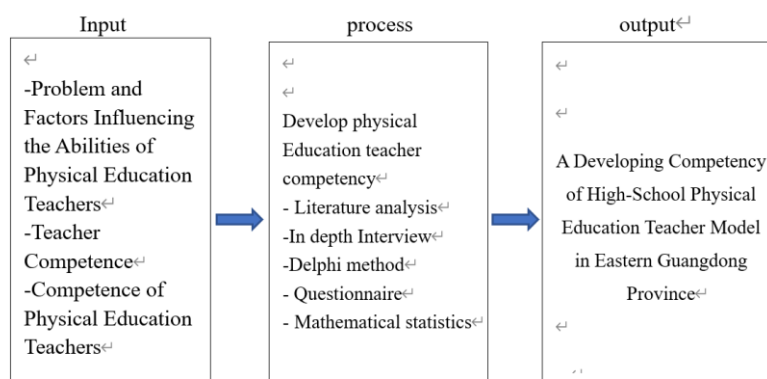


Figure 1 Research Framework

Methodology

To achieve the aims, this research adopted a combination of qualitative and quantitative methods and was divided into three different Phases. Details were as follows:

Phase 1: exploring the components of competence of high school physical education teachers.



This phase is qualitative research. The research adopted the literature to systematically comb the research status and related theories. adopted the in-depth interview, 15 physical education teachers with senior titles and 10 years or more experience in high school physical education were selected for interviews. Interviews were conducted in person, online, or by mail, and data was collected using semi-structured interview forms. adopted Delphi, 17 well-known experts in the field of high school sports, teachers' college sports teaching and research experts, or first-line high school sports master studio leaders were selected to develop a questionnaire on the competence of high school physical education teachers. Data was collected in the form of questionnaires in person, online, or by mail. Then, the data was analyzed using the content analysis method.

Phase 2: Questionnaire distribution and collection.

This phase is quantitative research. The questionnaire was adopted. After the researcher determined the Population and sample, the data were collected in the form of a questionnaire formed by the Delphi method through face-to-face, online, or email. There were 1526 high school physical education teachers in Eastern Guangdong, and the sample size for this research was 308 according to Krejcie and Morgan's (1970) sampling table.

Phase 3: Data analysis.

In this phase, Descriptive Statistical Analysis, Exploratory Factor Analysis, and Confirmatory Analysis were carried out on the collected data by mathematical statistics to construct and verify the competency model of high school physical education teachers in eastern Guangdong. On this basis, the guidelines for developing the competency of high school physical education teachers in eastern Guangdong were proposed.

Results

The research adopted a literature review and sorted out a total of 6 dimensions, covering 58 variables. Using an in-depth interview method, 46 variables were summarized. Then, two rounds of investigation were carried out on 17 experts by Delphi method. After removing some factors and adding some factors, IOC evaluation was carried out, and an evaluation scale with 9 dimensions and 51 variables was compiled. Finally, Cronbach's Alpha The KMO, and Bartlett's Test were used to further test the validity and internal consistency of the scale. The details are shown in Table 1 and Table 2.

Table 1 Results of the internal validity of the questionnaire

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.86	0.861	51

From Table 1, it was evident that Cronbach's alpha coefficient was at .86 which can be used to describe the reliability of the questionnaire.

Table 2 The KMO and Bartlett's Test results of the questionnaire

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.87
Bartlett's Test of Sphericity	Approx. Chi-Square	14218.549
	df	703
	Sig.	.000

From Table 2, it was evident that The KMO test results of the data collected from the research were .87.



Through the questionnaire survey, it was found that the competency of high school physical education teachers in eastern Guangdong was composed of 9 dimensions and 51 variables. The details are shown in Table 3.

Table 3 Competency composition of high school physical education teachers in Eastern Guangdong

Dimension	Quantity
Research and Innovation Capacity (RIC)	6
Information Gathering Capacity (IGC)	4
Teaching and Organizational Skills (TOS)	12
Specialized Knowledge (SK)	6
Personal Characteristics (PC)	10
Interpersonal Relationship (IR)	3
Professional Quality (PQ)	3
Teacher-student relationship (TSR)	3
Professional Development (PD)	4
Total	51

Through exploratory factor analysis, it was found that the competency of high school physical education teachers in eastern Guangdong was composed of 9 dimensions and 38 variables. The details are shown in Table 4.

Table 4 Convergent Validity

Rotated Component Matrix									
Variable	Component								
	1	2	3	4	5	6	7	8	9
RIC6	.941								
RIC5	.919								
RIC4	.889								
RIC3	.886								
RIC2	.885								
RIC1	.834								
SK4		.936							
SK2		.925							
SK6		.917							
SK5		.917							
SK1		.911							
SK3		.887							
PC1			.903						
PC5			.878						
PC2			.869						
PC3			.821						
PC4			.799						



Rotated Component Matrix										
Variable	Component									
	1	2	3	4	5	6	7	8	9	
TOS8				.929						
TOS11				.923						
TOS10				.877						
TOS12				.818						
TOS9				.814						
IGC4					.845					
IGC2					.823					
IGC1					.807					
IGC3					.802					
PQ2						.882				
PQ1						.864				
PQ3						.817				
IR3							.864			
IR1							.840			
IR2							.772			
PD3								.876		
PD2								.821		
PD1								.712		
TSR1									.832	
TSR3									.802	
TSR2									.719	

Following the recommendations of Hair and Fornell, the convergence validity of each dimension of the competency of high school physical education teachers in Eastern Guangdong is shown in Table 5.

Table 5 Convergent validity analysis

Inter-Item Correlation Matrix											
	CR	AVE	RIC	TOS	IGC	SK	PC	IR	PQ	TSR	PD
RIC	0.965	0.822	0.91								
TOS	0.947	0.780	.37	0.88							
IGC	0.835	0.560	.22	.40	0.75						
SK	0.960	0.801	.16	.08	.06	0.89					
PC	0.948	0.784	.34	.35	.29	.22	0.86				
IR	0.838	0.637	.26	.28	.29	.26	.50	0.80			
PQ	0.856	0.665	.27	.35	.28	.17	.40	.39	0.82		
TSR	0.822	0.611	.37	.37	.28	.25	.57	.38	.36	0.78	
PD	0.809	0.589	.51	.29	.28	.22	.33	.32	.32	.36	0.77

Based on the results of inferential statistical analysis, the competency model of high school physical education teachers in Eastern Guangdong was constructed by using software. The details are shown in Figure 2.

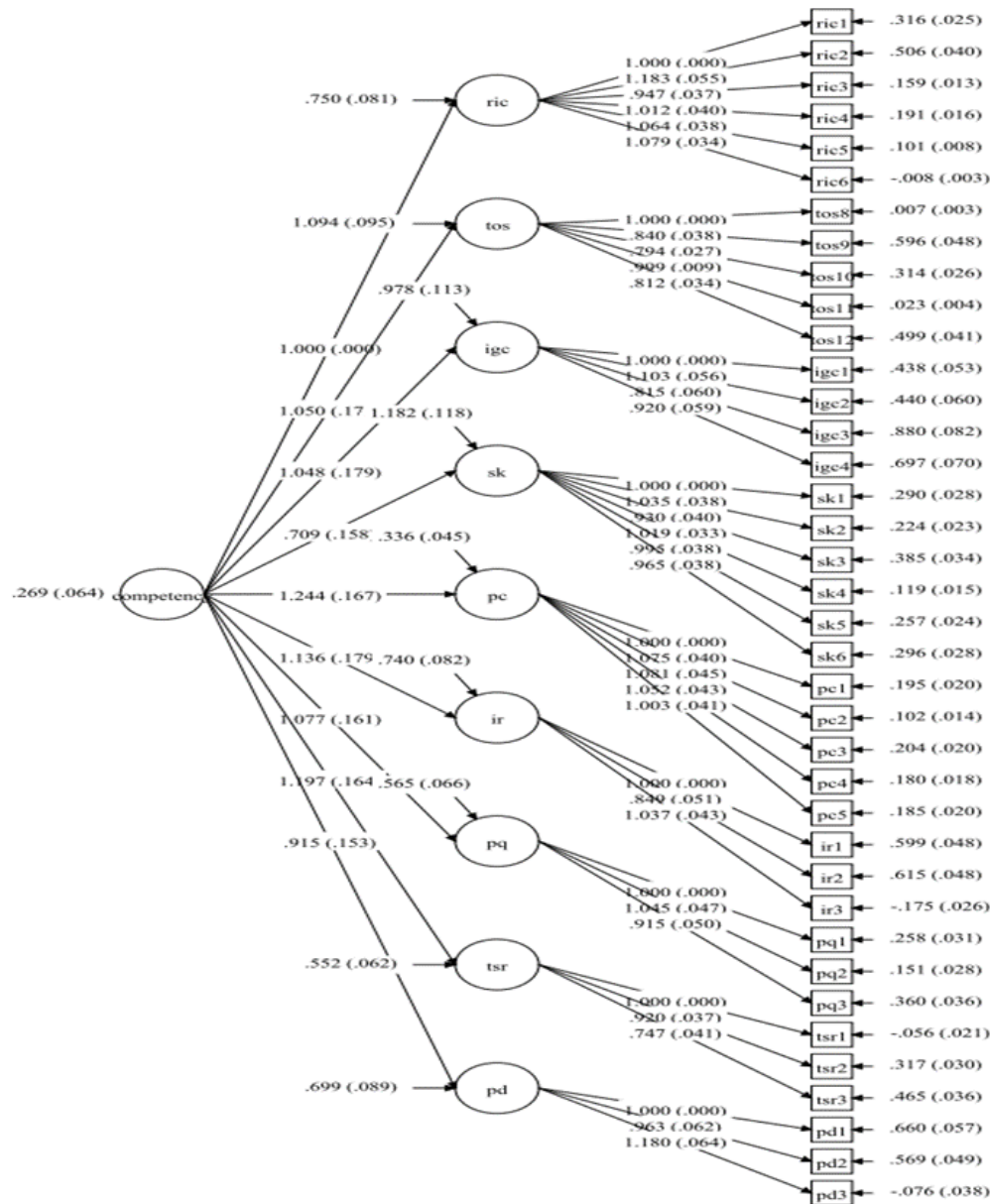


Figure 2 The model of this research

Following the model fit indices for exploratory factor analysis, the fit of the theoretical model of physical education teacher competency in high schools in Eastern Guangdong is shown in Table 6.

Table 6 The fit of the theoretical model

	Numerical value	Excellent fitting index	Effective Fitting index	Fit or not
Chi-square	1841.392			
df	656			
χ^2/df	2.807	<3	<5	Fit
P-value	.000	>0.05		
CFI	0.917	>0.9	>0.8	Fit
TLI	0.911	>0.9	>0.8	Fit



	Numerical value	Excellent fitting index	Effective Fitting index	Fit or not
RMSEA	0.077	<0.05	<0.08	Fit
SRMR	0.077	<0.05	<0.08	Fit

According to Table 6, the Chi-square of this model was 1841.392, df was 656, and Chi-square/df was 2.807, which was lower than 3, indicating a good fit of the model. The RMSEA value was 0.077, lower than 0.08, indicating a good fit for the model. The CFI was 0.917, higher than 0.9, indicating a better degree of fit. TLI was 0.911, higher than 0.9, indicating a better model fitting effect. At the same time, the SRMR was 0.077, which was also lower than 0.08, indicating that the fitting effect is superior. In summary, these fitting indexes are in line with the reference standards, which shows that the fitting degree of the model is very good.

To sum up, the competency of high school physical education teachers in eastern Guangdong was composed of 9 dimensions and 38 variables. There are 6 variables in the dimension of Research and Innovation Capacity (RIC), 4 variables in the dimension of Information Gathering Capacity (IGC), 5 variables in the dimension of Teaching and Organizational Skills (TOS), 6 variables in the dimension of Specialized Knowledge (SK), 5 variables in the dimension of Personal Characteristics (PC), 4 variables in the dimension of Interpersonal Relationship (IR), 4 variables in the dimension of Professional Quality (PQ), 4 variables in the dimension of teacher-student relationship Teacher-student relationship (TSR), and 4 variables in the dimension of Professional Development (PD). Based on the above model, 38 guidelines for developing competency of high school physical education teachers in eastern Guangdong were proposed from 9 dimensions. The detailed information is shown in Table 7.

Table 7 Guidelines

Dimension	No.	Guidelines
PART A: Research and Innovation Capacity	1	continue to improve teaching
	2	introduce new sports programs
	3	pay attention to cutting-edge information
	4	participate in educational reform topics
	5	choose personalized learning
	6	active curriculum development
PART B: Information Gathering Capacity	1	intelligent information acquisition
	2	continuous learning
	3	time management
	4	caring for students
PART C: Teaching and Organizational Skills	1	personalized communication
	2	continuous exercise
	3	proficient in teaching design
	4	classroom control
	5	good at problem-solving
PART D: Specialized Knowledge	1	scientific training
	2	excellent professional knowledge
	3	optimal matching education
	4	excellent teaching plan
	5	accurate term expression
	6	striving for the competition honor
PART E: Personal Characteristics	1	modest and prudent
	2	love learning
	3	optimistic and cheerful



Dimension	No.	Guidelines
PART F: Interpersonal Relationship	4	inclusive
	5	patient and full sense of achievement
	1	transpositional consideration
	2	Positive expression
	3	quiet contribution
PART G: Professional Quality	1	moral integrity
	2	a sense of mission
	3	academic integrity
PART H: Teachers-Students Relationship	1	Communication skills
	2	trust and resonance
	3	teacher-student interaction
PART I: Professional Development	1	research on innovation
	2	knowledge expansion
	3	leadership for change

Conclusion

Based on the research objectives, the conclusion will be presented as follows:

1. The competency model of high school physical education teachers in eastern Guangdong was composed of 9 dimensions and 38 variables.
2. There were 38 guidelines for developing the competency of high school physical education teachers in eastern Guangdong.

Discussion

Through the research, this paper determines the Research and Innovation Capacity (RIC), and Information Gathering Capacity (IGC) of high school physical education teachers' competence. Teaching and Organizational Skills (TOS), Specialized Knowledge (SK), Personal Characteristics (PC), Interpersonal Relationship (IR), Professional Quality (PQ), Teacher-student relationship (TSR), Professional Development (PD) Nine elements. These components together constitute a comprehensive framework of competency developing, developing high school physical education teachers with strong scientific research and innovation ability, accurate information collection, proficient teaching and organizational skills, excellent professional knowledge, strict professional ethics, diligent, friendly, optimistic, and motivated. These findings help enhance the competence of high school physical education teachers, promoting the overall development of high school physical education teachers, and the construction of excellent high school physical education teachers.

In addition, 38 guidelines for the competency development of high school physical education teachers in eastern Guangdong were summarized. These guidelines cover all aspects of competency, including teaching methods, curriculum development, access to information, problem-solving, communication, professional ethics, research innovation, and knowledge development. From the personal level: it improves the professional knowledge and teaching technology of teachers, improves the comprehensive quality of teachers, and guides the development of teachers' profession. From the level of school and government, it has important application value in the improvement of teaching quality, teacher recruitment and selection, teacher training, and so on. In a word, the results of this study are comprehensive and provide theoretical guidance and practical reference for the construction of excellent high school physical education teachers. At the same time, it has promoted the reform of high school physical education and further promoted the comprehensive reform and development of China's new college entrance examination.



Recommendation

1. Recommendation for Policies Formulation and Practical Application: (1) Strengthen physical education teacher education and training. (2) Design a comprehensive physical education teacher evaluation system, and improve the physical education teacher evaluation system. (3) Encourage sustainable professional development of physical education teachers. And (4) Improve the information literacy of physical education teachers

2. Recommendation for Further Research: (1) The specific influencing factors of physical education teachers' competence. (2) Compare the competency differences of physical education teachers under different backgrounds. (3) Develop an effective competency training and evaluation system for physical education teachers. (4) Compare the influence of different teaching methods on physical education teachers' competence.

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