

Research on the Competence of Physical Education Teachers in Middle Schools

Jun Xiang¹, Qian Xiang^{2,*}

¹*School of Physical Education and Health, Zhaoqing University, Zhaoqing, Guangdong, China*

²*Nine-Year School in Pingba Township, Guzhang County, Xiangxi, Hunan, China*

**Corresponding author*

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Abstract: This study uses Delphi method and AHP to study the index system of middle school physical education teachers' competency, finds out the typical indicators that affect middle school physical education teachers' competency and their weights, and provides information for middle school physical education teachers' competency evaluation, professional development, selection, Examination provides reference. The results show that the competency indicators of middle school physical education teachers are composed of four first-level indicators: professional ability, personal characteristics, driving ability, and scientific research and innovation ability. It consists of 17 secondary indicators such as students and sense of responsibility. Among them, the first-level indicators and weights are: professional ability (0.39), personal characteristics (0.13), driving ability (0.12), and scientific research and innovation ability (0.35). Secondary indicators: sports skills (0.04), teaching and organizational skills (0.08), competition management skills (0.05), communication skills (0.06), motivation (0.05), self-confidence (0.05), hard work (0.04), career preference (0.05), focus on students (0.09), responsibility (0.08), reflection ability (0.08), lifelong learning (0.06), clear development goals (0.06), innovation ability (0.06), scientific research ability (0.06), enterprising spirit (0.05), solidarity and cooperation (0.04)

1. Introduction

Education is the foundation. In 2010, the State Council promulgated the Outline of the National Medium- and Long-Term Education Reform and Development Plan (2010-2020), which mentioned that to improve the quality of compulsory education, it is necessary to strictly implement the national curriculum standards for compulsory education, teacher qualification standards, and to have teachers in physical education and other disciplines. Fully open the prescribed courses. In 2015, the General Office of the Ministry of Education issued the "Measures for the Monitoring and Evaluation of Students' Physical Health", "Measures for the Evaluation of Physical Education Work in Middle and Middle Schools", and "Measures for the Annual Report of School Physical Education Work", and proposed that school physical education should be based on the promotion of students' physical health. Reform school sports as the focus. The main object of the school is the students and the teachers. The quality of the school's physical education work and the physical health of the students are directly

related to the school's physical education teachers. In recent years, the country and schools have made great efforts in this area, but the physical health of students is declining, which brings serious challenges to the physical education teachers who are on the front line of school physical education work. It can be seen that what qualities and abilities a qualified physical education teacher should have is the top priority for the current school physical education work.

Education is the cornerstone of national rejuvenation and social progress. It is the fundamental way to improve the quality of the people and promote the all-round development of people. It is the hope of hundreds of millions of families for a better life. In 2010, the State Council promulgated the "Outline of the National Medium- and Long-Term Education Reform and Development Plan (2010-2020)" (hereinafter referred to as the "Outline"), and pointed out that the national curriculum standards and teacher qualification standards for compulsory education should be strictly implemented. Equipped with teachers of physical education and other disciplines, fully open the prescribed courses; in terms of students' physical fitness, scientifically arrange study, life, and exercise. Vigorously carry out the "sunshine sports" campaign to ensure that students exercise for one hour a day and continuously improve their physical health. To sum up, the "Outline" puts forward higher requirements for the all-round development of students in the compulsory education stage, especially for the physical health of students. Undoubtedly, this is an immediate consideration for teachers on the front line and raises a higher standard for practitioners in the teaching profession. Under the background of the "Sunshine Sports" movement, physical education teachers in the compulsory education stage are also strictly tested. The professional ability of physical education teachers directly affects the actual implementation of the "Outline". So what is the competence of physical education teachers for this position [1,2]? How to evaluate the competence of physical education teachers [3,4]? In reality, is the competence of physical education teachers suitable for the actual development of students in the region to some extent [5]? With the above problems in mind, this study summarizes the actual status of physical education teachers' competency in practical positions from the relevant research on physical education teachers' competency at the level of previous research.

Teacher competency is developed on the basis of the connotation of competency. Teacher competency is the application of competency theory in the field of pedagogy. The early domestic research on teacher competency mostly focused on the research on competency and ability, that is, a What qualities and abilities should a qualified teacher possess [6].Some studies have pointed out that the competence of physical education teachers refers to the potential and deep-level characteristics of individuals who can distinguish excellent performers from mediocre performers in the field of school physical education teaching. The individual potential characteristics that distinguish high-performance teachers from ordinary teachers mainly include personal characteristics such as ability, self-awareness, motivation, and related personality characteristics [7].The unique competency characteristics of physical education teachers' competence, the general teacher's competence model is not fully applicable to the conclusion of physical education teachers [8].Meng Wen determined competency characteristics through questionnaires and verified by exploratory factor analysis, and finally obtained 5 first-level indicators (subject theoretical knowledge, professional skills, professional quality, development characteristics, communication and coordination) and 24 second-level indicators of college sports. Teachers' competency model, and thinks that the construction of college physical education teacher's competency model has important practical significance for the implementation of performance management in colleges and universities and the professional development of teachers' personal [9,10]. To sum up, most scholars tend to build a competency index system based on the research on the competence of physical education teachers, and then compare different objects to find the differences between them, and some scholars tend to study the competence of physical education teachers in different regions. The differences and influencing

factors of power are then used as the medium to give improvement measures.

According to numerous research literatures, the concept of physical education teacher competency is derived from the concept of competency, which can be defined as: in school physical education, satisfying the three important factors of knowledge, skills and personal characteristics is different from general physical education. Teachers have potential competencies. Physical education teacher index is a complex collection group, which includes middle school physical education teachers' work, morality, life, ability to lead a team competition, teaching ability, scientific research ability, organizational ability and many other aspects. Researches on teacher competence mainly focus on what kind of actual job competence teachers should have, what level factors affect teacher competence, whether it can be reasonably predicted, and the summary and reflection of teacher competence at the current stage. Comparing the research results of Chinese physical education teachers' competency with teachers' competency, it appears to be very few and in its infancy. Most Chinese scholars tend to build a competency index system based on the research on the competence of physical education teachers, and then compare different objects to find the differences between them. Some scholars tend to study the differences in the competence of physical education teachers in different regions, and influencing factors, and then take improvement measures as a medium. It can be seen that the concept of physical education teacher competency in this study is derived from the concept of competency. Physical education teacher competency is three important factors that satisfy knowledge, skills and personal characteristics in school physical education work. What qualities and abilities should a qualified physical education teacher possess? On the basis of constructing the competency index of middle school PE teachers, this research analyzes the basic characteristics of middle school PE teachers' competency, and finds out the typical indexes and their weights that affect middle school PE teachers' competency. It can contribute to the selection and evaluation of middle school physical education teachers, and provide a basis for the professional development, competency assessment, physical education teacher selection and assessment of middle school physical education teachers.

2. Research objects and research methods

This paper takes the competency index of middle school physical education teachers as the research object. First, the index system of middle school physical education teacher's competence is constructed through literature method and Delphi method. Then, the analytic hierarchy process is used to construct the comparison matrix of the two indicators of middle school physical education teachers' competency, and the weight of the indicators is calculated. Finally, the logical analysis method is used to analyze the index system and index weight details as follows:

2.1. Delphi method

The Delphi method is that each expert independently scores the index content according to their own knowledge and experience accumulation (without mutual knowledge), and finally summarizes and summarizes the expert opinions to obtain a statistically significant expert consensus result. Use the Likert 5-level scoring method to assign scores to the competency indicators of middle school physical education teachers (1 is "not important", 2 is "not very important", 3 is "more important", and 4 is "important", 5 points are "very important" [10]), and the indicators with significant differences are screened. Among them, 10 expert questionnaires were distributed (Appendix B), 10 valid questionnaires were recovered, and the recovery rate was 100%. 15.38% of the experts thought that the validity of the questionnaire was high, 53.85% of the experts thought that the validity of the questionnaire was high, and 23.08% of the experts thought that the validity of the questionnaire was average. It shows that the validity of the questionnaire is high. At the same time, using the "split-half

method", the product-difference correlation coefficient of the "half-test" scores of the questionnaire was 0.8304. After being corrected by the Spearman-Brown Formula, the split-half reliability coefficient was 0.9012, indicating that the questionnaire was highly reliable.

2.2. AHP

AHP is to regard a complex multi-objective problem as a system, decompose the objectives into multiple levels, and quantify the qualitative indicators to calculate the weights as a scientific method for multi-plan decision-making [11]. In this paper, in order to establish the weight coefficient of each index of the competence of middle school physical education teachers, according to the established index system, the questionnaire of "Pairwise Comparison Matrix of Competency Indicators of Middle School Physical Education Teachers" (Appendix C) is designed. (6 questionnaires were issued, 6 valid questionnaires were recovered, and the questionnaire recovery rate was 100%). First of all, after the hierarchical processing of the competence index of middle school physical education teachers, a hierarchical structure model of middle school physical education teachers' competence is constructed. It also has its own characteristics. The concept of subjective thinking is compared and stratified by data comparison, and the matrix that finally passes the consistency test of the comparison matrix can be adopted. Then, construct a pairwise judgment and comparison matrix of indicators of each level of competency of middle school physical education teachers, so as to determine the proportion of each index in the target level [10].

3. Results and Analysis

3.1. The Construction of Competency Index of Middle School Physical Education Teachers

Table 1: The primary selection index system of middle school physical education teachers' competency

first-level indicator	Secondary indicators
Professional ability	motor skills
	Teaching and Organizational Skills
	Competition management ability
	communication skills
	Motivation
	Attention to detail
personality traits	confidence
	hard-working
	career preference
	Follow students
	professional engagement
Drive capability	sense of responsibility
	ability to reflect
	life-long learning
	clear development goals
	educational philosophy
Scientific research innovation ability	Creativity
	research ability
	enterprising
	Unity
	Self-evaluation

First, by consulting relevant literature and interviewing experts in this research field, we learned about the general content of middle school physical education teachers' competence, the factors that affect the improvement of middle school physical education teachers' competence, and the current status of middle school physical education teachers' competence. Then, according to the principles of comprehensiveness, operability, scientificity, and representativeness of the construction of the middle school physical education teacher's competence index system, extensively soliciting opinions and combining the layer-by-layer screening thinking of the analytic hierarchy process, the final determination of the middle school physical education teacher's competence in this study is made. Primary selection indicator system. In the final preliminary selection, professional ability, personality traits, driving ability, and scientific research and innovation ability are the first-level indicators of the competency of middle school physical education teachers. Hard-working, career preference, concern for students, responsibility, reflective ability, lifelong learning, clear development goals, innovation ability, scientific research ability, enterprising spirit, unity and cooperation, attention to detail, career investment, educational philosophy, self-evaluation 21 levels indicators (see Table 1).

Table 2: Statistics on the percentage of experts' scores on the competency index of middle school PE teachers

first-level indicator	5 points	4 points	Secondary indicators	5 points	4 points	3 points	2 points	1 points
Professional ability	100%	0%	motor skills	83%	16%	0%	0%	0%
			Teaching and Organizational Skills	86%	14%	0%	0%	0%
			Competition management ability	61%	34%	5%	0%	0%
			communication skills	74%	16%	10%	0%	0%
			Motivation	76%	21%	5%	0%	0%
			Attention to detail	0%	9%	52%	23%	10%
personality traits	81%	18%	confidence	65%	31%	5%	0%	0%
			hard-working	72%	24%	3%	0%	0%
			career preference	65%	30%	7%	0%	0%
			Follow students	63%	33%	0%	0%	0%
			professional engagement	4%	8%	52%	28%	10%
Drive capability	72%	29%	sense of responsibility	82%	15%	0%	0%	0%
			ability to reflect	60%	33%	5%	0%	0%
			life-long learning	55%	34%	5%	5%	0%
			clear development goals	63%	27%	4%	5%	0%
			educational philosophy	5%	5%	15%	65%	10%
Scientific research innovation ability	66%	35%	Creativity	52%	34%	7%	2%	0%
			research ability	68%	33%	2%	0%	0%
			enterprising	66%	34%	3%	0%	0%
			Unity	48%	48%	10%	0%	0%
			Self-evaluation	0%	5%	40%	45%	20%

Then, according to the blinding feature of the Delphi method, experts independently score the index content based on their own knowledge and experience accumulation, and finally summarize and summarize the expert opinions to obtain a statistically significant expert consensus result [10]. The specific operation process is as follows; first, according to the primary selection index system, construct an expert questionnaire for the index system of middle school physical education teachers; secondly, determine the expert candidates, contact and interview the experts; thirdly, use various forms such as interview, email, telephone, WeChat Distribute the expert questionnaire of the middle

school physical education teacher's competency index system to the experts. During the questionnaire survey, ask the experts why they filled out the questionnaire; finally, the questionnaires are counted, experts' opinions are collected, and the specific experts screen each first-level index and second-level index. Percentage statistic scores are shown in Table 2 below.

Finally, according to the calculation method of the Delphi method, the results of the expert questionnaire of the middle school physical education teacher competency index system are counted, and the index with a score value of ≥ 4 is screened out. The final index system established is briefly analyzed (see Table 3).

Table 3: Statistical table of expert questionnaires on "Competence Index System for Middle School Physical Education Teachers"

first-level indicator	Secondary indicators
Professional ability	motor skills
	Teaching and Organizational Skills
	Competition management ability
	communication skills
	Motivation
personality traits	confidence
	hard-working
	career preference
	Follow students
Drive capability	sense of responsibility
	ability to reflect
	life-long learning
	clear development goals
Scientific research innovation ability	Creativity
	research ability
	enterprising
	Unity

3.2. Establishment of the weight of the competence index of middle school physical education teachers

According to the index weight calculation formula of AHP and the results of index consistency test, the index weight that has passed the consistency test is finally selected as the index weight of the middle school physical education teacher's competence index in this study. Under the principle of analytic hierarchy process, with the pairwise comparison matrix as the core, the weights of indicators at all levels are calculated, and then the indicators that have passed the consistency test are used as the final indicator weights of this research, and the weights of the middle school physical education teachers' competency indicators are obtained (see Table 4).

Table 4: List of Competency Indicators and Weights of Middle School Physical Education Teachers

first-level indicator	Weights	Secondary indicators	Weights
Professional ability	0.39	motor skills	0.04
		Teaching and Organizational Skills	0.08
		Competition management ability	0.05
		communication skills	0.06
		Motivation	0.05
personality traits	0.13	confidence	0.05
		hard-working	0.04
		career preference	0.05
		Follow students	0.09
Drive capability	0.12	sense of responsibility	0.08
		ability to reflect	0.08
		life-long learning	0.06
		clear development goals	0.06
Scientific research innovation ability	0.35	Creativity	0.06
		research ability	0.06
		enterprising	0.05
		Unity	0.04

4. Discussion

The competency of physical education teachers is different from the potential competence of general physical education teachers in terms of three important factors that satisfy knowledge, skills and personal characteristics [7]. From Table 3 and Table 4, it can be seen that the primary secondary indicators of middle school physical education teachers' competency indicators were originally 21, and after screening by experts, the final secondary indicators were 17. The experts agreed that the attention to details in professional competence Indicators, career investment indicators in personality traits, educational concept indicators in driving ability, and self-evaluation indicators in scientific research innovation ability can be eliminated. And other indicators can comprehensively reflect the specific meaning of the middle school physical education teacher competency indicators, as follows:

(1) Professional ability

The professional ability indicators of middle school physical education teachers after the unanimous approval of the expert group team include five secondary indicators: sports skills, teaching and organizational skills, competition management skills, communication skills, and motivation. Through expert interviews, it is known that the main quality of an excellent middle school physical education teacher is his professional quality. He should not only have good sports skills, but also have good teaching and competition management skills, and more importantly, he should have the ability to mobilize students' enthusiasm. Ability to assist students to actively participate in sports activities, build a bridge and media between students and sports. Middle school physical education teachers not only need to teach students to master sports skills, but also need to teach students in accordance with students' growth and development laws and the personality traits of different age groups, which puts forward higher requirements for teachers' professional ability. Therefore, members of the expert group believe that sports skills, teaching and organizational skills, competition management skills, communication skills, and motivational indicators are the main factors that constitute the professional

ability of middle school physical education teachers.

(2) Personality traits

The personality trait indicators of middle school physical education teachers after being consistently recognized by the expert group team include four secondary indicators of self-confidence, hard-working, occupational preference, and attention to students. Through expert interviews, we know that the task of an excellent middle school physical education teacher is to teach by words and deeds, and use his words and deeds to influence and drive students. From this perspective, personal characteristics of teachers also have a greater impact on students' learning. The characteristics of teachers' self-confidence are shown in their self-confidence in their profession, self-confidence in personal teaching plans, self-confidence in personal teaching organization, competition management, etc. If a teacher is not confident or lacks self-confidence in the above content, then his professional quality is also worthwhile considered. At present, affected by many factors, the current physical education class conditions and production facilities in various districts vary, physical education classes are often crowded out by the main class, and problems such as the large number of people in middle school physical education classes still emerge. In this working environment, many physical education teachers often experience job burnout, and it is difficult to allocate time to each student, resulting in the phenomenon of "sheep herding" in the current middle school physical education class. It can be seen that the characteristics of middle school physical education teachers' personal self-confidence, hard-working spirit, the market's attention to the dynamics of each student, and the preference for the physical education teacher industry are the key issues that determine the personal characteristics of middle school physical education teachers.

(3) Driving ability

After being consistently recognized by the expert group, the middle school physical education teacher's driving ability indicators include four secondary indicators of responsibility, reflection ability, lifelong learning, and clear development goals. In the process of interviews with experts, it is known that as many physical education teachers grow older, due to the influence of personal, family, social and other factors, their career aspirations tend to decline with age, and their work in curriculum teaching, competition and other aspects will only be limited. Using personal experience, you will not learn from the old and bring forth the new, but will change the methods and means of self-teaching according to the current teaching and competition hotspot trends. Therefore, in order to avoid the above problems, it is necessary for physical education teachers to have a strong sense of responsibility, to maintain the original intention at anytime and anywhere, to constantly reflect on their own classroom teaching and usual training, and constantly learn new knowledge and new methods. and means to enrich oneself, formulate long-term goals, develop personal life-long habits, and keep it at the forefront of teaching and training. Therefore, experts agree that responsibility, reflective ability, lifelong learning, and clear development goals are the decisive factors for the driving ability indicators of middle school PE teachers.

(4) Scientific research and innovation ability

The indicators of scientific research and innovation ability of middle school physical education teachers after being unanimously recognized by the expert group team include four secondary indicators of innovation ability, scientific research ability, enterprising spirit, and unity and cooperation. In the process of interviews with experts, we know that "scientific research promotes teaching, training, and teaching and training feeds back scientific research" is a phrase that many experts often talk about in interviews. For middle school physical education teachers, all scientific research ideas come from daily teaching and training. It is scientific to look at daily teaching and training problems from the perspective of scientific research. Middle school physical education teachers pay attention to the improvement of scientific research ability is the focus of middle school physical education classroom reform, is the "magic weapon" to solve the problems of daily teaching,

training and competition. Judging from the current situation of middle school physical education teachers in their own affairs, there is a lack of communication among teachers, resulting in the inability to share resources, good courses cannot be displayed in public, and existing problems cannot be solved and shared in a timely manner. The motivation for the improvement of scientific research ability of middle school physical education teachers. Therefore, experts agree that communication and cooperation between physical education teachers can also promote personal development and the enthusiasm of the entire teaching team in teaching and training. It can be seen that the four secondary indicators of innovation ability, scientific research ability, enterprising spirit and unity and cooperation are the core elements of the index of scientific research and innovation ability of middle school physical education teachers.

It can be seen that as the primary condition of physical education teachers' basic competence, they should have strong professional quality and athletic ability. Secondly, as a teaching profession, when facing different groups of people and different ages, teaching and training need to be treated differently according to their physiological and physical development characteristics, so there will inevitably be many difficulties in teaching and training. If a teacher sticks to the rules, it will be difficult to continue to engage in heavy teaching and training tasks in the information age. Therefore, this requires teachers to have a high awareness of problems and use the perspective of scientific research to solve practical problems. Thirdly, due to the tedious nature of physical education teachers' work, physical education teachers who are on the front line all year round often experience job burnout, which requires teachers to self-monitor and improve themselves, and use diversified means to promote personal growth. The object of work is the crowd, which requires teachers to teach according to the psychological characteristics of middle school students and teach students in accordance with their aptitude.

5. Conclusion

The competency of physical education teachers is three important factors that satisfy knowledge, skills and personal characteristics in school physical education work. The competency indicators of middle school physical education teachers constructed in this study include four professional ability, personal trait, driving ability, and scientific research and innovation ability. The first-level indicators are composed of 17 second-level indicators, such as sports skills, teaching and organizational ability, competition management ability, hard work, career preference, attention to students, and sense of responsibility. At the same time, the index system of middle school physical education teachers constructed in this study can contribute to the selection and evaluation of middle school physical education teachers provides the basis for the professional development of middle school physical education teachers, competency assessment, selection and assessment of physical education teachers. However, there are still some limitations in this paper: the index system and weights of middle school physical education teachers' competency are only constructed from a theoretical point of view, and no empirical research is carried out from a practical point of view. The practicability of the index system needs to continue to be verified. Further in-depth research, from the perspective of verification, to check the scientificity of the index system again to ensure the index system.

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References

- [1] Li Qiong, Xu Hong, He Wenjie, Gao Dan Xingyang. (2016) *The competency model and performance characteristics of middle-level managers in kindergartens*. *Research on Preschool Education*, 9, 48-57.
- [2] Pang Yajuan, Zhou Lanshu. (2015) *Bibliometric analysis of nursing competency research in my country based on CBM*. *Journal of Nursing*, 30(06), 96-99.
- [3] Liao Hongjian, Zhang Qianwei. (2017) *The SPOC Blended Teaching Competency Model of College Teachers: A Study Based on Behavioral Event Interviews*. *Open Education Research*, 23(05), 84-93.
- [4] Du Fang, Luo Zhongshu. (2016) *Research hotspots and evolution of competency theory at home and abroad: Based on bibliometric analysis from 1990 to 2016*. *Journal of Huaqiao University (Philosophy and Social Sciences Edition)*, 6, 44-52+98.
- [5] Dai Xin, Qin Qiaoyong, Yang Xue, Liu Li, Tong Fengming. (2016) *The competency characteristics and influencing factors of successful people in the early stage of innovation and entrepreneurship—Based on the analysis of "Forbes China's 30 Entrepreneurs Under 30" in 2015*. *Educational Research*, 37(12), 89-96+111.
- [6] Wu Guolin. (2021). *Research on the competency index system of primary school physical education teachers in Guangzhou [D]*. *Guangzhou Institute of Physical Education*, 3-7.
- [7] Huang Ruixia. (2010) *Research on the teaching competence of physical education teachers*. *Teaching and Management*, 41-42.
- [8] Lu Sanmei, Zhu Shiyan. (2012) *Research on the construction of competency model for physical education teachers*. *Journal of Physical Education*, 19(2), 83-88.
- [9] Meng Wen. (2017) *Construction of Competency Model for Physical Education Teachers in Colleges and Universities*. *Journal of Nanjing Institute of Technology (Social Science Edition)*, 17(3), 56-61.
- [10] Xiang Jun. (2018) *Research on the structural model of 100m swimming quality in the Guangzhou Sports High School Entrance Examination*. *Guangdong: Master Thesis of Guangzhou Institute of Physical Education*, 13-23.
- [11] Wang Yingluo. (2003) *System Engineering*. Beijing: Machinery Industry Press, 130-140.