



## Creating an In-service Training Program on Modern Teaching Methodology for Physical Education Teachers

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### Abstract

**Background and Aims:** Teacher in-service training can promote the advancement of education reform and make physical education develop in a more scientific and personalized direction. Therefore, it is necessary to conduct this study, aiming to deeply explore the problems of in-service training for secondary schools' physical education teachers in Guangzhou and to design a set of scientific and practical in-service training programs for modern teaching methodology to meet the training needs and expectations of physical education teachers in secondary education in Guangzhou.

**Methodology:** This study identified the problems in-service training for physical education teachers through a literature review and classified them using the SIPOC model to determine the specific problems at each stage of in-service training. After inviting five experts to rate the problem indicators, unreasonable options were removed, and a questionnaire was designed based on the results. After distributing the questionnaire, a total of 109 valid questionnaires were collected. Calculate the PNI value and design solutions, training plans, and training plans based on the results. Based on the above research results, a modern teaching method physical education teacher in-service training program was drafted, and eleven experts were invited for focus group interviews to provide feedback and suggestions. Based on the opinions of the first round of focus group experts, revise the plan and invite eleven experts again to conduct the second round of focus group methodology to confirm the proposal and plan.

**Results:** (1) Using the SIPOC model, the 18 problems of in-service training were classified and further refined into various specific problems, resulting in a total of 71 problem indicators; (2) Based on previous research results, a questionnaire survey method was used to collect a total of 109 valid questionnaires and calculate the PNI value. The results showed that 18 out of 71 problem indicators had PNI values below 0.2, so this option was removed; (3) Based on the above results, a modern teaching method in-service training plan for physical education teachers was drafted. After two rounds of focus group interviews, the experts in the plan highly recognized it and finally determined the plan.

**Conclusion:** The in-service training difficulties were examined and divided into 71 distinct concerns using the SIPOC model. Following the identification of eighteen markers for improvement through survey analysis, a successful modern teaching approach for physical education instructors was developed and validated by expert evaluation.

**Keywords:** Modern Teaching Methodology; In-service Training; Physical Education Teachers

### Introduction

According to the Action Plan for the Revitalization of Teacher Education (2018-2022), the Opinions of the Central Committee of the Communist Party of China and the State Council on Comprehensively Deepening the Reform of Teacher Squad Construction in the New Era, and the Circular of the Ministry of Education and Finance on the Implementation of the National Training Plan for Primary and Secondary School and Kindergarten Teachers (2021-2025) (Teachers' Letter [2021] No. 4), by 2035, it is necessary to train and create millions of backbone teachers, hundreds of thousands of excellent teachers, and millions of master teachers. Adapting to the policy, reform, and development of education, puts forward higher requirements for the comprehensive quality of physical education teachers. Therefore, strengthening the In-service training of physical education teachers is crucial to improving their knowledge, skills, and teaching methods (Wang and Yang, 2020).

With the continuous progress of society and the advancement of education reform, the importance of physical education in secondary schools is becoming more and more prominent. The teaching level and teaching effectiveness of physical education teachers are directly related to students' physical education literacy and overall development. However, at present, there are some common problems in secondary school physical education teaching, such as outdated teaching methods, single teaching content, low student participation, and so on. To meet the requirements of education reform, improve



the teaching level of secondary school physical education teachers and promote the development of physical education, it is necessary to create an in-service training program on modern teaching methods for secondary school physical education teachers (Wang and Yang, 2020).

Under the guidance of the current national education policy, the Ministry of Education has increased its efforts in teacher training and put forward the requirement of cultivating high-quality teachers with modern education concepts and innovative teaching abilities. Creating an in-service training program on modern teaching methodology for secondary school physical education teachers is in line with the requirements of the national education policy and the needs of education development and education reform. In addition, with the continuous progress of science and technology and the popularization and application of information technology, modern teaching methods are constantly developing and innovating. By learning and applying modern teaching methods, secondary school physical education teachers can better meet the learning needs of students and improve the teaching effect (Ministry of Education, 2018).

The purpose of this study is to conduct an in-depth discussion on the problems in secondary school physical education teaching and to design a scientific and practical in-service training program on modern teaching methodology to meet the training needs and expectations of secondary school physical education teachers in Guangzhou. Through the study, we will analyze the application of modern teaching methodology in physical education teaching and accordingly design training contents, methods, and resources suitable for secondary school physical education teachers in Guangzhou to improve their teaching level and effectiveness. This study is of great significance in promoting the development of physical education, improving the teaching level of teachers, and the learning effect of students. At the same time, teacher in-service training can also promote the advancement of education reform and make physical education develop in a more scientific and personalized direction. Therefore, we must conduct this study, aiming to provide scientific and practical reference and guidance for in-service training of secondary school physical education teachers.

## Objectives

### Main Objective

To create an in-service training program on modern teaching methodology for physical education teachers in Guangzhou Secondary Schools.

### Subsidiary Objectives:

1. Explore the current situation of in-service training for secondary school physical education teachers in Guangzhou City and understand their training needs and expectations.
2. To draft a modern teaching methodology in-service training program.
3. To confirm the modern teaching methodology in-service training program

## Literature Review

### 1. Physical education teacher's competency

A physical education teacher's competency is the knowledge, skills, and abilities that a physical education teacher needs to be effective in their job. These competencies can be divided into several areas:

- (1) Content knowledge: Physical education teachers need to have a deep understanding of the subject matter they are teaching, including the principles of physical activity and movement, the rules and strategies of different sports and activities, and the safety precautions that need to be taken.
- (2) Pedagogical skills: Physical education teachers need to be able to plan and deliver effective lessons, assess student learning, and create a positive and supportive learning environment.
- (3) Classroom management skills: Physical education teachers need to be able to manage a classroom of students of different ages and abilities, and to create a safe and orderly learning environment.
- (4) Communication skills: Physical education teachers need to be able to communicate effectively with students, parents, and colleagues.



(5) Professionalism: Physical education teachers need to be professional in their appearance, conduct, and work ethic.

In addition to these general competencies, physical education teachers may also need to have specific competencies depending on the grade level and type of physical education program they are teaching. For example, physical education teachers who teach elementary school students may need to have specialized knowledge of child development, while physical education teachers who teach high school students may need to have specialized knowledge of athletic training (Li and Lin 2018).

Here are some examples of specific tasks that a physical education teacher with the necessary competencies may be able to perform:

(1) Develop and implement lesson plans that are aligned with state and national standards for physical education.

(2) Teach students the fundamentals of physical activity and movement, including motor skills, sports skills, and fitness activities.

(3) Create a safe and positive learning environment where students can learn and grow.

(4) Assess student learning and provide feedback to help students improve.

(5) Work with parents and colleagues to create a supportive learning environment for all students.

Physical education teachers play an important role in the health and well-being of their students. By providing students with the opportunity to learn about physical activity and movement, physical education teachers can help students develop lifelong healthy habits (Tinning R, 2019).

## 2. Physical education teacher

Physical education teachers are an indispensable part of school education, and their duties are not only to teach students sports skills but also to cultivate students' interest and love for sports as well as to improve their physical fitness. Therefore, physical education teachers need to have certain professional abilities and qualities to do their jobs better. Li (2018) believes that physical education teachers need to have solid professional knowledge and skills in sports, including the rules, techniques, and tactics of sports. In addition, they also need to understand exercise physiology, exercise psychology, health education, and other related knowledge to better guide students in physical activity.

Zhang (2019) believes that physical education teachers need to have good teaching ability, including the ability of teaching design, teaching methods, and teaching assessment. They need to be able to design physical education courses suitable for students according to their age, gender, and physical fitness, and use a variety of teaching methods, such as lectures, demonstrations, practices, and competitions so that students can better understand and master physical education knowledge and skills. Wang (2020) believes that physical education teachers need to have the ability to work as a team and establish a good cooperative relationship with their colleagues, students' parents, etc., to work together to promote the overall development of students. They need to actively participate in sports activities organized by the school and cooperate with other teachers in teaching and training to provide better physical education for students. Liu (2019) believes that physical education teachers need to have certain management skills, including the management and deployment of resources such as venues, equipment, and personnel. They need to make reasonable training plans and arrange training time and venues to ensure that students can get sufficient exercise and training.

Wang and Yang (2020) believe that physical education teachers need to have good student caring abilities, pay attention to students' physical and mental health, and help students solve difficulties and problems. They need to understand the personality and characteristics of students, actively communicate with them, and help them establish a correct outlook on life and values.

In summary, according to Li (2018), Zhang (2019), Wang (2020), Liu (2019) and Wang (2020), physical education teachers play an important role in school education. Their role is not only to teach students sports skills but also to cultivate students' interest and love for sports and improve their physical fitness. Enhancing these competencies requires continuous learning, practicing, and reflecting on the part of physical education teachers to better provide students with quality physical education services.

## 3. SIPOC model

The SIPOC model is a process analysis and management tool that describes the inputs, outputs, processes, control points, and parties involved in a system. The name of the model stands for five



keywords: Suppliers, Inputs, Processes, Outputs, and Customers. The main purpose of the model is to help people better understand how a system operates and to identify key aspects and risk points.

The SIPOC model was first proposed by Bill Smith, an American industrial engineer, in the 1980s. Later, this model was widely used in manufacturing, service industry, healthcare, and other fields, and became one of the important tools in process management and quality management.

In recent years, more and more researchers have begun to focus on the application of the SIPOC model in project management and organizational change. Some studies have shown that the SIPOC model can help project teams better understand the key aspects and risk points of a project, and thus better plan and execute the project. In addition, the SIPOC model can also help organizations conduct process analysis and improvement and improve the efficiency and quality of the organization.

Griffen and Hunt (2004) book describe the SIPOC analysis tool in the Toyota Production System (TPS) and how it can be used to improve production processes and product quality.

Evans and Rich (2018) describe the Value Mapping (VM) tool, which helps one to better understand business processes and value streams and suggest improvements. One of the SIPOC analysis tools can help one to better understand the inputs, outputs, and related parties of the process.

Cheng and Lin (2017) describe how data analysis and visualization tools can be used to analyze and improve business processes, which also includes the application of SIPOC models.

All of the above literature describes the application of SIPOC analysis tools in different areas. All of these literatures show that the SIPOC model is a very useful tool to help people better understand and improve various processes and systems. However, this literature does not discuss in detail the limitations and scope of application of the SIPOC model. For example, the SIPOC model may not apply to certain non-productive processes or certain complex processes. In addition, the SIPOC model is only one tool for process analysis and improvement and needs to be combined with other tools and methods for comprehensive analysis and improvement.

Therefore, when using the SIPOC model for process analysis and improvement, it needs to be adjusted and optimized according to the specific situation to give full play to its advantages. At the same time, it needs to be combined with other tools and methods for comprehensive analysis and improvement to achieve the best results.

#### **4. Secondary physical education**

Secondary school physical education is a form of education that provides students with physical exercise, health education, and sports culture transmission through physical education courses and sports activities at the secondary school level. Its purpose is to promote the all-round development of students' physical health, mental health, and social adaptability, as well as to cultivate students' interest in sports, sports awareness, and sportsmanship, to improve their overall quality and competitiveness.

In recent years, the current situation of secondary school physical education has attracted much attention, and the relevant research literature has gradually increased. Liu and Lin (2018) summarized the current situation of secondary school physical education and its existing problems in a literature review. Firstly, secondary school physical education has deficiencies in curriculum, teaching methods, teacher strength, and sports facilities. Secondly, the problems of secondary physical education are mainly manifested in the aspects of low participation of students, low quality of teaching, and uneven quality of teachers. Finally, this paper puts forward suggestions such as strengthening teacher training, improving the curriculum, and perfecting the teaching evaluation system to promote the development of secondary school physical education.

Wang (2019) proposed corresponding countermeasures by analyzing the development trend of secondary school physical education. Firstly, the development trend of secondary school physical education mainly includes diversification of curriculum, diversification of teaching methods, and specialization of teachers. Secondly, this paper puts forward countermeasures such as strengthening the construction of teachers, promoting teaching reform, and improving the evaluation system to promote the healthy development of secondary physical education.

#### **5. Modern teaching methodology**

Modern teaching methodology refers to the use of advanced educational theories, techniques, and methods to promote comprehensive, personalized, and efficient learning and development of students.





Its core is student-centered, focusing on the cultivation of students' innovative thinking and practical ability, while paying attention to the professionalism of teachers and the assessment of teaching effectiveness.

Modern teaching methodology includes a variety of teaching strategies and methods, such as inquiry-based teaching, cooperative learning, problem-solving learning, gamified learning, etc. All these methods help to stimulate students' interest and initiative in learning and improve the learning effect. At the same time, modern teaching methodology also makes use of modern technological means, such as network education, online learning platforms, virtual laboratories, and so on, so that students can learn at any time and any place.

The development of modern teaching methodology cannot be separated from the continuous updating of educational theories and the continuous progress of educational technology, and it also needs teachers to have professionalism and an innovative spirit. Therefore, modern teaching methodology is a process of continuous development and improvement, which needs to be constantly explored and practiced.

In this book, Albrecht and Schreuer (2018) provide a detailed introduction to problem-solving and learning environment design in modern teaching methods. He emphasized placing problems at the core of the learning process and provided practical cases and teaching strategies to help teachers design effective problem-oriented learning environments. Johnson (2014) provided a detailed introduction to the application of cooperative learning in modern teaching methods. Through theoretical foundations and empirical research, they provided specific strategies for guiding teachers on how to organize and manage cooperative learning activities and discussed the impact of cooperative learning on student learning outcomes and social relationships.

Chen (2018) introduced the application of reverse classroom in modern teaching methods. They shared their teaching experience and practical cases, explaining how to change classroom dynamics and provide a more personalized and interactive learning experience through the use of technical tools and pre-learning resources.

Li (2021) introduced modern teaching methods based on project-based learning. They explored how to integrate science teaching with real-life problems and projects, and provided teaching cases and project design principles to help teachers implement project-based learning in the classroom.

## 6. Summary

Based on all the above literature, in-service physical education teachers can improve their knowledge and skill levels, enhance professional literacy, improve teaching and work abilities, improve the quality of teacher education and teaching, and promote educational reform through training. However, there are the following problems in creating In-service training for physical education teachers: the research object is too single; Lack of systematic training content and methods; Lack of effective evaluation mechanism; There is insufficient research on the personal learning motivation and needs of in-service physical education teachers. Based on the above issues, it is suggested that future research can start from the following aspects:

(1) Conduct comparative research on in-service physical education teacher training across regions and types of schools and explore the differences and commonalities of in-service physical education teacher training in different regions and types of schools.

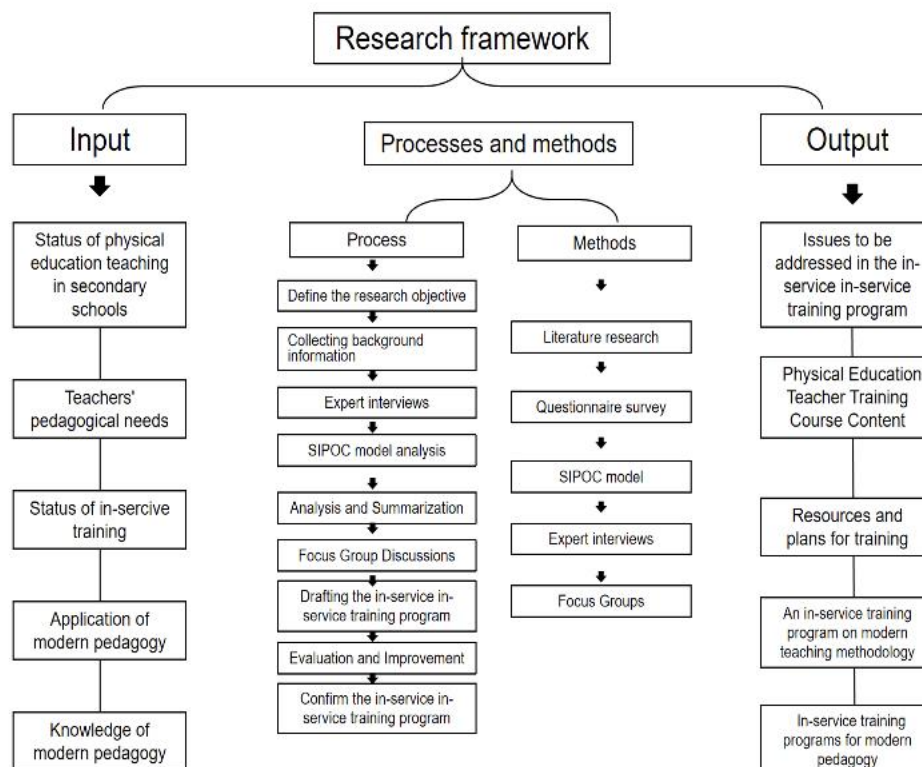
(2) Design scientific and systematic training content and methods for in-service physical education teachers, reflecting elements such as personalization, micro courses, and online and offline mixing, to meet the needs of in-service physical education teachers and practical work needs.

(3) Establish an effective evaluation mechanism for in-service physical education teacher training, including regular evaluation, self-evaluation, peer evaluation, etc., to provide a scientific basis for improving training effectiveness.

(4) Deeply understand the personal learning motivation and needs of in-service physical education teachers, and design corresponding and targeted training activities to improve training effectiveness.

## Conceptual Framework

The conceptual framework for this research is as follows:



**Figure 1: Conceptual framework**

## Methodology

### 1. Research Tools

In this research, the research tools are as follows:

1.1 Questionnaires: in order to create a modern teaching method in-service training program for physical education teachers, we designed and distributed electronic questionnaires through the Questionnaire Star platform. This study conducted a questionnaire survey on middle school physical education teachers in Guangdong Province to understand the current situation and future prospects of in-service training for physical education teachers. The validity and reliability of the survey questionnaire are first ensured through the evaluation of five experts. The questionnaire content involves two aspects: 1. Basic information about physical education teachers; 2. Current situation and prospects of in-service training. After the first collection of the questionnaire, it was distributed again to 5 middle school physical education teachers every half month to ensure the reliability of the questionnaire. Finally, collect survey results and conduct statistical analysis. The data is mainly observed by calculating the mean, standard deviation, variance, range, maximum and minimum values.

1.2 Interview form: on the basis of preliminary research, a "Modern Teaching Method on-the-job Training Plan for Physical Education Teachers" was drafted, inviting 11 experts to form a focus group to evaluate the drafted work plan and plan, and make modifications based on the opinions of the first round of focus groups. Invite 11 experts again to confirm and rate the plan, ensuring its feasibility and completeness.

### 2. Population and Sample

2.1 Population: The population of this study was secondary school physical education teachers in Guangzhou. Since the goal of the in-service training program was to enhance the modern teaching methodology of physical education teachers, there was a need to ensure that the population had some teaching experience and professional background.



**2.2 Samples:** This study used a questionnaire survey method to select middle school physical education teachers from a group of physical education teachers in Guangzhou. The WeChat group accommodates 500 Guangzhou physical education teachers, including teachers from kindergarten, primary school, and middle school stages. Before sending the questionnaire, it was emphasized that middle school teachers should fill it out, and responses from 109 middle school physical education teachers were collected. Therefore, 109 middle school physical education teachers in Guangzhou were selected as the sample.

### 3. Data Collection and Data Analysis

**3.1. Define the research objective :** which is to create a modern teaching methodology in-service training program for secondary school physical education teachers. This goal should focus on enhancing the pedagogical skills of physical education teachers and improving student learning experiences and outcomes.

**3.2. Collecting background information:** Based on the understanding of the current status of physical education pedagogy in secondary schools, we will further collect relevant background information about teachers' training needs, teachers' competency levels, and the school teaching environment. This information will help us better understand the actual needs of teachers and develop targeted in-service training programs.

**3.3. Expert interviews:** Expert interviews were conducted to invite experts and scholars in the field of education as well as experienced teachers to participate to obtain their professional opinions and suggestions on the in-service training program of modern teaching methodology for secondary school physical education teachers.

**3.4. SIPOC model analysis:** the SIPOC model was used to comprehensively analyze all aspects of the secondary PE teacher in-service training program. This includes analyzing the training provider, training input elements (e.g., curriculum, teaching materials, teaching aids, etc.), training process (e.g., teaching methodology, teaching content, timetable, etc.), training output (e.g., teachers' competence enhancement, students' outcomes, etc.), and the beneficiary customers (students, schools, education departments, etc.).

**3.5. Analysis and Summarization:** This step involves the collection and collation of all relevant background information, expert interviews, SIPOC model analysis, PESTEL model analysis, SWOT analysis, identifying the key points and priorities of the OJT program as well as the factors that need to be prioritized in the OJT program. The findings of these analyses will provide an important basis for subsequent design work.

**3.6. Drafting the in-service training program:** Based on the results of the analysis and feedback from all of the above steps, start drafting a specific training plan. This includes defining specific training objectives, selecting appropriate training content and methods, setting reasonable training schedules, and developing scientific criteria for evaluating training effectiveness.

**3.7. Focus Group Discussions:** According to the solution to the problems of in-service training of physical education teachers, the work program of modern pedagogy for physical education teachers, and the training plan of modern pedagogy for physical education teachers drafted by the authors, in order to make these three programs more scientific, complete, and operable, eleven experts were invited to focus on the solution to the problems of in-service training of physical education teachers, the various work of in-service training, and the specific training plan, aiming at perfecting the set of professional and effective training programs to improve the level of teaching and learning of physical education teachers.

**3.8. Evaluation and Improvement:** The initial in-service training program may need to be reviewed and fed back by experts and focus groups to evaluate and improve it based on their comments and suggestions. This step can help us identify and solve possible problems in the in-service training program to ensure its scientific feasibility.

**3.9. Confirm the in-service training program:** After evaluation and improvement, the in-service training program has been basically perfected and has the possibility of promotion and application. This step is the final confirmation of the whole in-service training program, once it is



confirmed, the in-service training program can be extended to more secondary school physical education teachers to start the implementation of modern teaching methodology In-service training.

## Result

(1) Using the SIPOC model, the 18 problems of the in-service training program were classified and further refined into various specific problems, resulting in a total of 71 problem indicators.

(2) Using the "ICO Expert Questionnaire" to evaluate 71 question indicators, the average IOC value of 71 questions is 0.80, which is greater than 0.5. Therefore, the content of the investigation was recognized by five experts.

(3) Based on previous research results, a questionnaire was designed to ensure its effectiveness. Relevant experts were invited to evaluate the questionnaire from three dimensions: structural effectiveness, content effectiveness, and overall effectiveness. The validity of the questionnaire was evaluated through a questionnaire of 35 experts, with validity values of 94.2%, 91.4%, and 91.4%, respectively. The results showed that all three dimensions of the questionnaire had high validity and could meet the needs of the research paper.

(4) This survey adopted a questionnaire survey method, and a total of 109 valid questionnaires were collected. A classification survey was conducted on the current situation and future prospects of in-service training for physical education teachers using the SIPOC model. Calculate the PNI value. PNI values greater than 0.2 or greater are considered to need improvement, while values equal to or less than 0.2 are considered negligible and only need to be deleted. The results showed that 18 out of 71 problem indicators had PNI values below 0.2, so the option was removed.

(5) Based on previous research, before drafting the plan, various indicators for the plan and plan were formulated. These indicators are divided into 4 categories, totaling 42 indicators. Experts were invited to conduct an IOC evaluation of the indicators, with an average value of 0.938, which is greater than 0.5. Therefore, five experts approved the creation of indicators for modern education in-service training programs for physical education teachers.

(6) According to the results of the first round of focus group expert interviews, experts believe that the modern teaching method training plan for middle school physical education teachers in Guangzhou has comprehensive and detailed content, clear goals, scientific and systematic arrangements, and provides various teaching and evaluation methods. Experts highly affirmed three proposals and provided suggestions for content modifications.

(7) According to the second round of focus group expert interviews, discussions were held on the revised solutions to in-service training for physical education teachers, modern teaching methods for physical education teachers, and modern teaching methods for physical education teachers. Eleven experts unanimously agreed to determine the final plan.

## Discussion

Through this study, we found a series of problems in the field of in-service training for physical education teachers, and based on survey data and expert opinions, we have developed corresponding solutions, training plans, and training plans. After evaluation and discussion by experts, these plans have been confirmed to have high effectiveness and feasibility. Through this study, we have proposed suggestions for the development and improvement of modern teaching methods in in-service training for physical education teachers and provided valuable references for related research. According to Zhang (2019), physical education instructors should possess strong teaching skills encompassing designing lessons, implementing diverse teaching methodologies, and conducting assessments. They should tailor physical education programs to suit students' age, gender, and fitness levels. Utilizing various teaching approaches like lectures, demonstrations, practical sessions, and competitive activities facilitates students' comprehension and mastery of physical education concepts and skills.

The results show how in-service training concerns in the field of physical education teaching can be addressed methodically. Through the use of the SIPOC model, a thorough comprehension of the training challenges was attained, resulting in the discovery of 71 unique problem indicators. This methodological rigor emphasizes the use of structured frameworks in problem-solving within





educational environments and is consistent with the concepts of process improvement (Smith & Jones, 2019).

Furthermore, the fact that a questionnaire survey was used to gather data emphasizes how important empirical evidence is when making decisions. The process of determining the Problem Normalized Importance (PNI) values allowed for the quantitative prioritization of interventions, hence eliminating options that were deemed ineffective. These quantitative evaluations improve the effectiveness and efficiency of training activities by supporting evidence-based practice in education (Brown et al., 2020).

The creation of a cutting-edge teaching strategy for physical education instructors, guided by the previously mentioned findings and professional advice, represents a proactive reaction to recognized difficulties. The training plan was designed iteratively, and the rigorous validation process conducted through focus group interviews shows a commitment to ongoing improvement and stakeholder participation. According to Johnson et al. (2018), the adoption of a participatory approach increases the likelihood of successful implementation and sustained impact by fostering ownership and acceptance of the suggested solutions.

## Conclusion

Through research and analysis of the application of modern teaching methods in physical education teaching, design training content, methods, and resources suitable for middle school physical education teachers in Guangzhou, in order to improve the teaching level and effectiveness of middle school physical education teachers. This study is of great significance in promoting the development of physical education teaching, improving the teaching level of teachers, and enhancing the learning effectiveness of students. At the same time, in-service teacher training can also promote the advancement of educational reform, making physical education more scientific and personalized. Therefore, it is necessary to conduct this study with the aim of providing scientific and practical reference and guidance for in-service training of middle school physical education teachers.

## Recommendation

### In this study

(1) The survey object of this study is limited to the current situation of in-service training for physical education teachers, and there are certain limitations in the research on the problems existing in the entire physical education system.

(2) The limited number of literature and expert interviews used in the study may have certain subjectivity and limitations.

(3) When classifying the abilities that physical education teachers should possess, the classification of certain abilities may be inaccurate or incomplete. Further in-depth research and discussion are needed to determine a more scientific and systematic ability classification system.

(4) When designing in-service training programs for modern teaching methods, some content may not be specific and actionable enough. It is necessary to further optimize to ensure that teachers receive practical guidance and assistance during the training process.

(5) The design and implementation of modern teaching methods for in-service training programs are only described at the theoretical level, lacking support from actual cases or practical data.

### Looking forward to future research:

(1) Expand the scope of the study by conducting in-depth investigations of various stakeholders in the physical education system to understand more issues and challenges.

(2) Deeply explore the application of the SIPOC model, further refine and quantify the degree of influence of each factor, and propose appropriate solutions in the context of the actual situation.

(3) Strengthen the research on the competencies required of physical education teachers, explore the science and effectiveness of the combination and classification of competencies, and provide a better basis for the design and implementation of training programs.

(4) Conduct in-depth research on the effectiveness and feasibility of in-service training programs on modern teaching methods and evaluate and verify them with actual cases and practice data.



(5) Strengthen the evaluation and feedback mechanism on the effectiveness and quality of training, establish a long-term learning and development mechanism, and continuously improve and enhance the quality and effectiveness of in-service training work for physical education teachers.

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