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Innovative Development of Physical Education Teaching Models in Vocational Colleges

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Abstract: Physical education teaching in vocational colleges has a significant positive effect on improving students' psychological and physical fitness. The research method adopted in this article is a combination of qualitative analysis and control experiments. Firstly, a large amount of relevant literature was collected and read to gain a deeper understanding of existing theories and optimal experimental plans, followed by the design of experimental plans. Secondly, conduct random interviews with students from a certain vocational college to understand their attitudes towards physical education classes, as well as the current status and existing problems of physical education teaching models in vocational colleges. Finally, a comparative experimental study was conducted to explore the impact of an innovative teaching model with student-centered and portfolio learning evaluation on the effectiveness of physical education teaching. The innovative student-centered physical education teaching model can effectively improve the effectiveness of physical education classes and is a practical and innovative development model for physical education teaching in vocational colleges.

1. Introduction

In recent years, the government has prioritized vocational education, implementing policies to boost higher vocational education development. Consequently, higher vocational education has grown significantly, becoming a vital force for the widespread promotion of higher education. However, its societal recognition remains relatively low [1-2]. China is in an economic reform stage, entering industrial structural adjustment. This period sees a shift in the production mode, necessitating corresponding adjustments in higher education structure to adapt. Education is pivotal for livelihoods, effectively enhancing them. It represents a key aspect of higher education and advanced vocational training. A robust vocational education system is crucial for teaching, attaining goals, enhancing worker skills, and fostering productivity in vocational education and society.[3-4]

Sports, as a discipline that improves the physical fitness and abilities of students, especially under the conditions of continuous quality reform, has been widely carried out in universities[5-6]. However, the contradiction between vocational colleges and learning public sports cannot be ignored, especially in terms of teaching mode, which is difficult to adapt to the current situation of vocational sports. Moreover, sports is a foreign education, and its development lifespan is shorter than traditional ethnic sports. The teaching philosophy, teaching mode, teaching methods, etc. are

all introduced from abroad and innovated based on the actual situation of the country. In addition, in the process of comprehensive education, the management issues of physical education teaching in universities are becoming increasingly prominent, especially the unreasonable evaluation mechanism and the lack of enthusiasm for student physical exercise, which seriously affect the effective implementation of physical education teaching work. Faced with the new situation of educational reform and development, as well as the requirements of the era of comprehensive education and growth, universities should adhere to the orientation of the era environment when carrying out sports education management activities[7-8].

This article takes vocational colleges as the research object, analyzes the current situation and problems of physical education teaching models, and discusses the necessity of reforming and innovating physical education teaching models. It explores the specific strategies and implementation paths of physical education reform and innovation in vocational colleges, and promotes its effective implementation. This will have a positive effect on the development of vocational education and the improvement of students' comprehensive quality. This article mainly explores new models suitable for the development of vocational sports through a combination of qualitative analysis and comparative experiments.

2. Related Words

The student-centered teaching model shifts some learning responsibilities to learners and gives them more autonomy in the learning process. The student-centered teaching model emphasizes personalization, flexibility, and student participation, aiming to better meet the needs of students and promote their comprehensive development. This teaching model emphasizes personalized learning for students. By understanding the interests, subject tendencies, and learning styles of each student, teachers can better adjust teaching strategies to better meet their needs and improve learning outcomes. This method can increase students' participation in exploring, speculating, reflecting, analyzing, and finding solutions to challenges in the classroom [9]. In this approach, teachers promote student learning through a combination of questions, challenges, scenarios, and modified learning activities to cultivate their creativity, lifelong learning habits, and content knowledge[10]. Students are no longer passive recipients in the teaching process, but actively participate in discussions and problem-solving, cultivating teamwork and communication skills. The two-way communication between teachers and students creates a comfortable learning environment where students can practice and collaborate without worrying about failure [11].

In addition, under the guidance of the teacher, students are able to analyze peer performance with 90% accuracy, and peer teaching methods will not change the teacher's organizational time [12].

Concept map learning method is a learning strategy that promotes understanding and memory by drawing concept maps. This method emphasizes organizing knowledge into a graphical structure to present the relationships between topics more clearly. It can help students simplify complex processes and promote participation in learning content. Teachers can promote concept maps to students as a framework for showcasing knowledge domains, defining problems, or explaining the learning process [13]. Differing from traditional linear note-taking, this learning approach offers a deeper comprehension and personalized learning. Concept maps also facilitate collaborative learning, empowering students in decision-making while teachers act as facilitators [14]. These benefits enable more students to have learning autonomy and continuously improve their knowledge. A concept map is a graphical representation that displays the structure of a knowledge system through the connections and branches of key concepts. Students need to think about the relationships between concepts when creating concept maps, which helps to gain a deeper understanding of the subject matter. The concept map learning method emphasizes active learning.

During the process of constructing concept maps, students need to organize, summarize, and express information. This active participation promotes a deeper understanding of knowledge, rather than just simple memorization. Concept maps can help students establish a holistic perspective on knowledge. By connecting different concepts, students can see the relationships between knowledge, promote interdisciplinary comprehensive understanding, and help form a more complete cognitive structure. The concept map learning method cultivates students' thinking integration ability through visualization and information organization, promoting deep learning and understanding. This method is applicable to various disciplinary fields and enhances the learning effectiveness of students.

Educators can employ portfolios for assessment, merging learning elements for personalized student experiences. This integration helps students set clear goals, track progress, and fosters a non-critical environment for risk-taking, knowledge exploration, and holistic well-being. Enhanced ownership in learning boosts enjoyment, motivation, and self-efficacy[15].

Teachers should urge students to include health information, reflections, and sports logs in portfolios, using colors, stickers, pens, and shapes for expressive understanding. Unlike traditional tests, this method enables effective evaluation, aiding teachers in assessing teaching methods, meeting standards, and planning future instruction [16-17]. Portfolios serve as a distinctive tool to advocate for sports and health education among stakeholders. They convey concise academic expectations and allow continuous monitoring of student learning, engaging parents, community members, managers, and staff.

3. Methods

3.1. Qualitative analysis method

Qualitative analysis is a research method aimed at gaining a deeper understanding and interpretation of non-numerical data, such as text, images, sound, etc. Unlike quantitative research methods, qualitative analysis emphasizes a qualitative understanding of phenomena, focusing on describing, explaining, and understanding the complexity and diversity of the research object. Qualitative analysis methods are usually more flexible and open, and researchers can continuously adjust their research direction based on their findings during the research process [18]. This is different from the pre-set assumptions and frameworks in quantitative research. Qualitative research can collect data from various sources, including observations, interviews, text analysis, etc. This enables researchers to integrate different types of information and obtain a more comprehensive understanding.

In order to explore the innovative development of physical education teaching models in vocational colleges, this study adopted a qualitative research method of reading a large amount of literature and conducting specific analysis and interviews. Interviews are conducted through in-depth communication with students from a certain vocational college to collect their needs and satisfaction with physical education courses. This method can provide researchers with a deeper understanding and capture the feelings and perspectives of students under the current traditional physical education teaching model. The topics covered include but are not limited to: the impact of physical education classes on students' physical health, whether physical education classes are helpful in cultivating team spirit, whether anxiety is felt during physical education classes, and whether self-efficacy can be achieved through physical education classes. During the interview process, an open-ended questioning approach was adopted to encourage participants to share their true perspectives and experiences. The interview gradually delves deeper to ensure coverage of all aspects of research focus. All interviews are recorded or recorded for subsequent analysis and organization.

3.2. Control experiment method

The control experiment method is a scientific research design that experimentally proves causal relationships [19]. In this experimental design, researchers evaluate the impact of a certain variable or treatment on the research results by comparing the experimental group with the control group. The control experiment method aims to eliminate other possible explanations and more accurately determine causal relationships. A control experiment includes an experimental group receiving treatment or intervention and an untreated control group. These two groups should maintain similarity in other factors that may affect the research results to ensure that the observed effects can be attributed to treatment or intervention. In order to ensure similarity between the experimental group and the control group, researchers usually use a random allocation method to randomly assign research subjects to the two groups [20]. This helps to control for potential confounding variables, so that the two groups have similar characteristics at the beginning of the experiment. There will be an independent variable and a dependent variable in the experiment. Independent variables are variables that researchers can manipulate or introduce during experiments, while dependent variables are variables that researchers observe and may be influenced by independent variables. In controlled experiments, both researchers and participants may not know whether they belong to the experimental group or the control group, in order to eliminate subjective bias and expected effects [21].

This study adopts an experimental research method, with the main purpose of comparing the impact of innovative physical education teaching models with student-centered and portfolio learning evaluation (such as companion teaching method, concept map teaching method, etc.) and traditional teaching models on the effectiveness of student physical education classes. Two classes were randomly selected for the study, one of which was the experimental group, adopting an innovative physical education teaching model with student-centered and portfolio learning evaluation. The other class was the control group, adopting a traditional physical education teaching model. Both the experimental group and the control group attended classes independently, with identical teaching content and progress. Before the experiment, neither the student nor the teacher knew whether they belonged to the experimental group or the control group.

4. Results and Discussion

4.1. Interviewing students

Table 1: Interview transcript data

	Sample size	Mean	Standard Deviation
I think gym class can promote physical fitness	34	3.16	.235
I think PE can develop team spirit	26	2.11	.254
I like to go to physical education class	45	2.33	.324
I think physical education is necessary	33	2.01	.234
I think physical education is fun	56	2.42	.174
I think physical education can develop my perseverance.	23	1.98	.254
I think I can gain self-efficacy in physical education.	45	1.88	.252
I think I can fully assimilate the knowledge and skills I learn in physical education.	34	3.02	.245
I will play sports after class	23	3.34	.302
Schools should improve the way they teach physical education	47	4.34	.342
There are things I like about physical education	43	2.30	.444
I feel anxious in PE class	45	3.87	.302

The specific interview results are shown in Table 1. Each answer is associated with a score, where "strongly agree" has a score of 5 and "strongly disagree" has a score of 1. It can be seen that most students have negative emotions towards attending physical education classes and do not believe that attending physical education classes has various benefits such as promoting physical health and cultivating team spirit.

4.2. Analysis of data from controlled experiments

This study aimed to explore the emotions of higher education students regarding physical education by investigating anxiety, self-efficacy, and beliefs. A questionnaire, initially comprising 120 items, underwent content validation by three physical education teachers to enhance its effectiveness. Following their input, some items were revised or removed, resulting in an 87-item questionnaire assessing six affective variables: anxiety (12 items), motivation (10 items), attitudes (14 items), autonomy (22 items), self-efficacy (20 items), and beliefs (9 items). A pilot test involving 30 students assessed internal consistency using a summary scale. Participants rated their agreement on a five-point scale, with reverse coding for negative statements. Higher scores indicated increased levels of anxiety, motivation, attitude, autonomy, self-efficacy, and beliefs. Internal consistency alpha estimates were reasonably reliable for each variable and the entire questionnaire (anxiety 0.95, motivation 0.75, attitude 0.77, autonomy 0.87, self-efficacy 0.85, beliefs 0.77, and total questionnaire 0.89).

To mitigate potential fatigue and boredom during prolonged questionnaire completion, we divided the survey into two sessions. This approach aimed to safeguard the integrity of the results by preventing the influence of participant fatigue. Before initiating the experiment, an independent samples t-test was conducted to ensure the comparability of the two groups. The resulting t-values affirm the homogeneity of affective variables in the two groups before the experiment. Simply put, the emotional states measured by the questionnaires in the two separate sessions were consistent prior to the experiment. Refer to Table 2 for the corresponding statistical data.

The participants completed the questionnaire in two sessions. A composite score of final grades in soccer, distance running, and basketball was employed for class comparison. Independent samples t-tests were utilized to examine differences in affective variables and grades between the two classes post-treatment.

Table 2: Means, standard deviations and t-values for mean differences between the two groups on pretest scores of affective variables.

	Number of experiments	Number of samples	Mean	Standard deviation	T-value	P-value
Anxiety level	1	39	3.16	.225	-.720	.479
	2	47	3.23	.238		
Extrinsic motivation	1	39	3.28	.353	.298	.776
	2	47	3.19	.442		
Intrinsic motivation	1	39	3.41	.174	-1.18	.263
	2	47	3.56	.254		
Attitude	1	39	3.58	.252	-1.04	.304
	2	47	3.68	.245		
Initiative	1	39	3.47	.302	-1.21	.235
	2	47	3.36	.342		
Self-efficacy	1	39	3.27	.444	-1.01	.318
	2	47	3.39	.302		
Sense of belief	1	39	3.54	.239	-1.29	.216
	2	47	3.68	.233		

Significant differences were found between the two classes on all affective variables except

extrinsic motivation. More specifically, the pressured group differed in anxiety (t = 4.24, p = .000), integrative motivation (t = 4.79, p = .001), attitude (t = 5.73, p = .000), autonomy (t = 3.61, p = .001), self-efficacy (t = 2.74, p = .009), and beliefs (t = 3.18, p = .006). This suggests that a student-centered and portfolios learning assessment model of instruction would have better affective outcomes than teacher-centered instruction, contributing to students' greater enjoyment of physical education classes. These results are summarized in Table 3 below.

Table 3: Means, standard deviations and t-values for mean differences between the two classes on posttest scores of affective variables

	Number of experiments	Number of samples	Mean	Standard deviation	T-value	P-value
Anxiety level	1	39	3.16	.230	4.24	.000
	2	47	2.64	.356		
Extrinsic motivation	1	39	3.35	.421	-1.39	.213
	2	47	3.94	.738		
Intrinsic motivation	1	39	3.38	.216	-4.79	.001
	2	47	4.30	.420		
Attitude	1	39	3.63	.176	-5.73	.000
	2	47	4.30	.402		
Initiative	1	39	3.33	.362	-3.61	.001
	2	47	3.76	.410		
Self-efficacy	1	39	3.25	.478	-2.74	.009
	2	47	3.63	.403		
Sense of belief	1	39	3.51	.265	-3.18	.006
	2	47	3.94	.304		

There was a significant difference in performance between the two classes, with the experimental group achieving better results. Table 4 below presents these data.

Table 4: Means, standard deviations and t-values for mean differences between the two groups in achievement

	Number of experiments	Number of samples	Mean	Standard deviation	T-value	P-value
Grades	1	39	206.00	11.00	-4.181	.000
	2	47	216.20	11.56		

5. Conclusion

By adopting a fusion method combining qualitative analysis and controlled experiments, this study delves into the innovative development of physical education teaching mode in higher vocational colleges. First, through literature review and qualitative analysis, it was found that the innovative physical education teaching mode with student-oriented and archival learning evaluation had a positive effect on students' physical education classroom effectiveness. Through the sample analysis of the controlled experiment, it was found that the experimental group using the innovative teaching mode of student-oriented and portfolio learning evaluation had a more positive psychological state for physical education classes compared with the control group continuing to use the traditional teaching mode, and the experimental class also performed better than the control class in the three courses of soccer, basketball and long-distance running.

In short, teachers who adopted a student-centered and portfolio learning assessment model for physical education classes were more likely to be successful in promoting student engagement and collaboration in learning to achieve learning outcomes. Teaching through peer teaching and concept

mapping are effective ways to improve the overall domain of student learning. Future research should consider larger, more diverse background samples and use practical teaching methods to obtain better results.

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