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Impact of Physical Education Informatization on the Physical Fitness of College Students in Guangdong, China

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Abstract: The development of college students' physical fitness has become an area of great concern in Chinese university physical education. This study aims to explore the effects of physical education teaching informatization on college students' physical fitness through quasi-experimental research methods. Through the introduction of informatization teaching methods in university physical education courses, a more effective learning and teaching process can be achieved. In this study, 15 freshmen from Guangzhou Software College were selected as respondents, and relying on the Internet, an eight-week informatized physical education teaching was carried out using video instruction, AI interaction, AR simulation, and Internet platform push. The pre-test and post-test of physical fitness of the respondents at various stages before and after the intervention of informatization technology were conducted by Chinese college students' physical fitness test standards, and the learning experience of the respondents in physical education class was investigated by questionnaire survey method, and then the measured results were statistically counted and analyzed by statistical methods. The results of the study showed that the physical fitness levels of the respondents after receiving the 8-week informationalized physical education intervention were improved to different degrees compared to the pre-intervention level. In addition, the results of the questionnaire about the participants' learning experience showed that the informatized teaching could stimulate the respondents' interest in learning, increase the intensity and frequency of exercise, and cultivate the habit of exercise, and that the students were more actively involved in the classroom activities in the informatized teaching environment, formed a closer cooperative relationship with their peers, and enhanced the learning experience. Therefore, this study preliminarily verified the positive impact of physical education teaching informatization on college students' physical fitness. It is suggested that more informatized teaching means should be gradually introduced into university physical education teaching to promote the overall development of students and improve the level of physical fitness. Future studies can further explore in depth the applicability of informatization teaching in different physical education courses and different disciplines to provide more scientific guidance for university physical education teaching.

Keywords: Informatization; AI Interaction; AR Simulation.

1. Introduction

With the development of the times and the continuous innovation and development of network technology, modern educational technology has been endowed with the transformation of informationization, and more and more advanced technologies are being used in education. In the field of education, educational reforms relying on the Internet and mobile applications have had a profound impact on human educational ideas. Educational informatization can give full play to the leadership of school leaders, macro-supervise and manage the teaching work of schools. In the teaching process, information-based teaching can also allow teachers to evaluate students' learning in real time and set learning content scientifically. Educational informatization urges educational administrators to change traditional teaching methods and means, resulting in significant changes in teaching content, forms and methods.

Traditional physical education in colleges relies on the form of face-to-face teaching, which is greatly affected by the teaching environment and teaching time, and students' exercise intensity, exercise frequency, sports participation, diversity of sports content, and psychological development are limited. In view of the difficulties faced by traditional physical education in colleges, this study relies on the Internet and uses information technologies such as video guidance, AI interaction, and AR simulation to carry out information-based physical education teaching activities that guide actual sports, and verifies the effectiveness of information-based physical education teaching activities in improving students' physical fitness. This study has empirical value and guiding significance for the promotion of information teaching mode in college physical education.

2. Statement of the Problem

This study will determine the improvement in physical fitness and learning experience of first-year students at Software Engineering Institute of Guangzhou with the end view of identifying from the informatization physical education teaching model.

Specifically, this study will answer the following research questions:

1. What is the profile of the respondents in terms of their;
1.1 Age
1.2 Sex
1.3 Years experience in athletic training?
2. What is the physical fitness test result of the respondents as determined by standard physical fitness test?
3. Is there a significant difference in the physical fitness test result when their profile is taken as test factor?
4. What is the assessment of the selected respondents on their learning experiences using informatization as

intervention measure in terms of:

4.1 exercise frequency

4.2 intensity exercise

4.3 participation

4.4 diversity in sports content

4.5 psychological development

5. Is there a significant difference in respondents' physical fitness test results before and after the informatization intervention learning experiences?

6. Based on the results of the study, what teaching model can be proposed?

3. Hypotheses

The following null hypotheses will be tested in this study:

Ho1: When profile is taken as test factors, there was no significant difference in student respondents' level of physical fitness before the intervention.

Ho2: There is no significant difference in respondents' physical fitness test results before and after the informatization intervention learning experiences.

4. Scope and Delimitation of the Study

This paper relies on internet technology, realizes information-based physical education through network communication platforms and mobile application software, and verifies the influence of information-based physical education teaching mode on the physical fitness of college students.

The respondents are 15 freshmen from the first year of Guangzhou Software Institute in 2023. This study has certain scope and limitations in formulating research plans and directions. Firstly, the main purpose of this study is to verify the impact of information-based physical education teaching mode on the physical quality of first-year college freshmen admitted in Guangzhou Software Institute in 2023, so as to build an efficient physical education teaching model. The limitations of the study mainly lie in the profiles of the respondents, including age, gender, sports experience, etc. In this study, respondents will be assessed before and after the intervention, and the differences in learning effects will be evaluated from the physical qualities of the respondents, including strength quality, speed quality, endurance quality, flexibility quality, and physical composition, so as to verify the impact of the information-based physical education teaching mode on the physical fitness of college students. In addition, this study will also evaluate students' sense of learning experience in the process of information-based physical education teaching, so as to support the effectiveness and necessity of information-based physical education teaching reform.

The sample participants of this study 15 student respondents will participate in the experiment who be will be selected from Guangzhou Institute of Software in the fall of 2023. Participants will be non-athletic majors, non-sports specialties students, high school graduates from across the country, majoring in repair, engineering and liberal arts.

The papers in this study are for academic purposes only. In this paper, the information collected by the researchers through questionnaires and other forms about the respondents' profiles, respondents' wishes, and test data will be kept strictly confidential. The questionnaire is distributed and collected electronically via the Internet, which ensures the efficiency of the questionnaire. The analysis of the questionnaire and test data will be processed by professional data analysis software. The study in this paper will last for 3 months and will cover the period of study of the physical education curriculum of the respondents. In the process of issuance, collection and collation of questionnaires, it is necessary to consider the learning process of respondents, so the questionnaire will be distributed in two times in the middle and end of the learning period of the respondents, covering the whole process of the respondents, so as to ensure the rationality and integrity of the data, and can also reflect the experience development process of the respondents in the implementation of information-based physical education. The study will be in the first semester of school year 2023-2024.

5. Research Design

The researcher was used quasi-experimental research approach. Quasi-experimental research is a research method that uses the method of real experiment to solve practical problems, which is close to reality, as far as possible to use the principles and requirements of real experimental design, maximize the control of factors, and carry out experimental treatment, so the experimental results of quasi-experimental research are easier to relate to the actual situation. This study will use a quasi-experimental design of a single group of pre-tests and post-tests, and assess respondents' fitness level and learning experience before and after the intervention through physical fitness tests and questionnaires to determine the effectiveness of the intervention. This approach helps researchers determine whether the intervention caused the observed changes. In this study, descriptive statistics and quantitative methods was used in experimental research to process the data in experimental research. The main source of study data is a researcher-made questionnaire, which was developed closely related to the problem statement of this study.

6. Sampling Method

The site of this study was Guangzhou Institute of Software in Guangzhou, Guangdong Province, China. Guangzhou Institute of Software was established in 2002 and began to implement undergraduate level academic education in 2006. The university has 9 departments, including software engineering, network technology, electronics, computer, digital media, games, management, finance and economics, and foreign languages, and offers 31 undergraduate majors, including software engineering, Internet of Things engineering, and logistics management, covering 5 university disciplines such as engineering, art, management, economics, and literature. At present, there are 15,000 undergraduate students and 920 faculty members. The school adheres to the school philosophy of "people-oriented, harmonious development, quality school, strong school with characteristics, and governing school according to law", and has achieved fruitful results after 20 years of development and construction. Under the guidance of the "Innovation and Strong School Engineering Center" and the "Quality Project of Private Universities" of the Provincial Department of Education, in-depth teaching reform has been carried out to vigorously improve the quality of connotation construction and education.

The study's population includes new freshmen students enrolled in the fall 2023 of Guangzhou Institute of Software with a total of 2,600 freshmen. The sample participants of this

study 15 students will be selected from Guangzhou Institute of Software in the fall of 2023. The paper in this study is for academic purposes only, and the investigator fully considers the personal privacy of the respondents in the process of developing the questionnaire, and the questionnaire will be conducted anonymously, even so, the brief information collected by the questionnaire about the respondent and the data obtained from the survey will be kept strictly confidential.

7. RESULTS AND ANALYSIS

Table 1. Demographic Profile of the Respondents

Demographic Profile	Categories	Frequency	Percentage
Age	18 years old and below	4	26.67
	19-20 years old	7	46.67
	21-22 years old	2	13.33
	23 years old and above	2	13.33
	Total	15	100.00
Sex	Male	8	53.33
	Female	7	46.67
	Total	15	100.00
Sports Experience	Regular Exercise	1	6.67
	Occasional Exercise	8	53.33
	Little Exercise	5	33.33
	No Exercise	1	6.67
	Total	15	100.00

Table 1 presents the demographic profile of the 15 subjects. This table is divided into three main demographic categories: Age, Sex, and Sports Experience.

In the Age category, the respondents are distributed across four age ranges. The majority of the respondents, 7 out of 15 or 46.67%, are in the 19-20 years old range. The next largest group, 4 respondents or 26.67%, are aged 18 years old and below. The 21-22 years old and 23 years old and above categories each have 2 respondents, making up 13.33% of the sample for each group. The total percentage for the Age category sums up to 100%.

Regarding Sex, the distribution between male and female respondents is nearly even, with a slight majority of males. 8 of the respondents are male, accounting for 53.33% of the sample, while 7 are female, comprising 46.67%. The combined total for both male and female respondents equals 100%.

The Sports Experience category is subdivided into four different levels of exercise frequency. The largest group within this category consists of those who engage in occasional exercise, representing 8 out of the 15 respondents, or 53.33%. Those with little exercise come next, with 5 respondents or 33.33%. Only 1 respondent is involved in regular exercise, and another single respondent reports no exercise, each contributing to 6.67% of the total. Similar to the other categories, the total percentage for Sports Experience adds up to 100%.

In summary, the table provides a clear breakdown of the demographic characteristics of the respondents, indicating a diverse age range with a slight majority in the 19-20-year age group, a balanced sex distribution with a small male majority, and varied levels of sports experience, predominantly occasional exercise.

Table 2. Physical Fitness Test Results Prior to Intervention (Pretest) of the Respondents

Domains	Mean	SD
Height (cm)	167.81	8.81
Weight (kg)	62.78	15.96
Spirometry (ml)	3517.87	861.64
Sit-Up-And-Bend (cm)	13.35	5.68
50-Meter Dash (seconds)	8.94	0.89
Standing Long Jump (cm)	183.07	26.11
Calisthenics - Sit Ups & Chin Ups (repetitions)	14.33	12.92
Middle-Distance Running (seconds)	266.53	17.28
Score	65.76	4.43

Table 2 outlines the results of a physical fitness test conducted on a group of subjects before the intervention was applied. The table is structured to present the mean and standard deviation (SD) for each domain of the fitness test, providing a statistical summary of the subjects' performance across various physical attributes and activities.

The first domain is Height, measured in centimeters (cm), with the subjects having an average height of 167.81 cm and a standard deviation of 8.81 cm. This suggests a moderate variation in height among the subjects. The Weight of the subjects is recorded next, with a mean of 62.78 kilograms (kg) and a larger standard deviation of 15.96 kg, indicating a wider range of body weights within the group.

Spirometry, measured in milliliters (ml), evaluates lung capacity, and the subjects have an average measurement of 3517.87 ml. The standard deviation is 861.64 ml, which points to substantial differences in lung function among the subjects. The Sit-Up-And-Bend test, assessing flexibility and core strength, is reported in centimeters, with a mean of 13.35 cm and a standard deviation of 5.68 cm, again highlighting variability in this domain.

The 50-Metre Dash, a measure of sprint speed, is completed on average in 8.94 seconds, with a relatively small standard deviation of 0.89 seconds, suggesting that sprint speeds are fairly consistent among the subjects.

The Standing Long Jump, a test of explosive leg power, has an average distance of 183.07 cm and a standard deviation of 26.11 cm, which indicates a moderate spread in jumping ability.

Calisthenics, specifically the number of Sit Ups & Chin Ups performed, is measured in repetitions. The mean number of repetitions is 14.33, with a high standard deviation of 12.92, revealing a wide disparity in the muscular strength and endurance of the subjects. Lastly, the Middle-Distance Running domain, likely recorded over a standard track distance, has a mean completion time of 266.53 seconds with a standard deviation of 17.28 seconds, showing some variability but generally consistent middle-distance running capabilities within the group.

The scoring based on the Chinese college students' physical quality scoring standard can be more intuitive to understand the level of physical quality of the subjects, and from the scoring statistics, the average score is 65.76 points (out of 100 points), and the standard deviation is 4.43 points. It shows that the physical quality of the subjects is at a medium level and does not have a large difference. This pre-test score basically represents the current level of physical fitness of college

students in Guangdong Province, China. On the other hand, the results of the pre-test indicate that the physical fitness of the subjects is not specific, which provides a better experimental sample for the later experimental intervention, and the physical fitness level of the study sample tends to be consistent.

Studies conducted in recent years consistently indicate varying levels of physical fitness among college students. A substantial proportion of college students continue to struggle to meet recommended guidelines for regular physical activity (Archer et al., 2019; Martins et al., 2020). These findings emphasize concerns regarding potential health risks associated with inadequate physical fitness in this population.

Table 3. Differences in Pretest Height (cm) Based on Demographic Profile

Profile	Mean	Stat. Value	P-Value	Interpretation/ Decision
Age				
Below 18 years-old	162.60	F = 0.60	0.63	Not significant/ Accept H0
18-21 years-old	169.56			
22-24 years-old	171.00			
Above 25 years-old	168.90			
Sex				
Male	173.75	t = 4.00	0.001	Significant/ Reject H0
Female	161.01			
Regular Exercise	170.80	F = 1.18	0.36	Not significant/ Accept H0
Occasional Exercise	163.99			
Little Exercise	173.04			
No Exercise	169.20			

Table 3 provides a statistical analysis of the differences in pretest height measurements among various demographic profiles of the research subjects. It uses inferential statistics to determine whether these differences are statistically significant.

In the age category, four age groups are compared: below 18 years old, 18-21 years old, 22-24 years old, and above 25 years old. The average height for the below 18 years-old group is 162.60 cm, and the F-statistic value is 0.60 with a p-value of 0.63, indicating no statistically significant difference in height across the age groups. Thus, the null hypothesis (H0), which suggests there is no difference, is accepted for the age profile.

When examining height based on sex, there is a noticeable difference. Males have an average height of 173.75 cm, and females have an average height of 161.01 cm. The t-statistic value is 4.00 with a p-value of 0.001, which is statistically significant. This result leads to the rejection of the null hypothesis (H0), indicating that there is a significant difference in height between males and females in this sample.

Regarding sports experience, grouped as regular exercise, occasional exercise, little exercise, and no exercise, the mean heights are 170.80 cm, 163.99 cm, 173.04 cm, and 169.20 cm, respectively. The F-statistic value for this set is 1.18 with a p-value of 0.36, showing that the differences in height based on sports experience are not statistically significant, leading to the acceptance of the null hypothesis for this demographic factor.

The statistical results of the data in Table 3 show that the results of the height test do not reflect differences when grouped by age and sports experience, except when grouped by gender. The differences in height by gender are determined by the physiological characteristics of gender. Some relevant academic studies have pointed out that the average height of 19-year-old Chinese males is 175.7 centimeters, and the average height of Chinese females is 163.5 centimeters, which is ranked first in East Asia (Lancet, 2020). Other articles have found that gender differences in height are widening, with male adolescents growing more significantly in height (Song, etc. 2021).

Table 4. Differences in Pretest Weight (kg) Based on Demographic Profile

Profile	Mean	Stat. Value	P-Value	Interpretation/ Decision
Age				
Below 18 years-old	53.28	F = 0.97	0.44	Not significant/ Accept H0
18-21 years-old	62.63			
22-24 years-old	73.65			
Above 25 years-old	71.45			
Sex				
Male	76.09	t = 8.61	0.000	Significant/ Reject H0
Female	47.57			
Regular Exercise	76.30	F = 2.43	0.12	Not significant/ Accept H0
Occasional Exercise	53.74			
Little Exercise	73.10			
No Exercise	70.00			

Table 4 analyzes the differences in pretest weight measured in kilograms (kg) among the research subjects, divided by demographic profiles such as age, sex, and level of regular exercise. The table uses statistical values to interpret whether these differences are meaningful.

For age, the participants are grouped into four categories: below 18 years old, 18-21 years old, 22-24 years old, and above 25 years old. The average weights for these age groups are 53.28 kg, 62.63 kg, 73.65 kg, and 71.45 kg, respectively. An F-statistic of 0.97 with a p-value of 0.44 for age suggests that the variation in weight among the different age groups is not statistically significant. Therefore, the null hypothesis (H0), which assumes no variance in weight across age groups, is accepted.

When segregating by sex, a stark contrast emerges. The mean weight for males is 76.09 kg, while for females, it is 47.57 kg. The t-statistic is a high 8.61 with a p-value of 0.000,

indicating a highly significant difference between the weights of males and females, leading to the rejection of the null hypothesis for the sex profile.

The last demographic profile considered is the level of sports experience, categorized by the frequency of exercise: regular, occasional, little, or none. The mean weights for these categories are 76.30 kg, 53.74 kg, 73.10 kg, and 70.00 kg, respectively. With an F-statistic of 2.43 and a p-value of 0.12, the differences in weight based on exercise frequency are not significant enough to reject the null hypothesis.

The statistics in Table 4 show that the weight test results did not reflect differences when grouped by age and athletic experience, except when grouped by gender. Differences in weight by gender are determined by the physiological characteristics of the sexes. Males have thicker bones and a greater proportion of muscle, while females have slimmer bones and a greater proportion of fat than males, and fat is less dense than muscle, so that males of the same height have a significantly higher body weight than females.

Table 5. Differences in Pretest Spirometry (ml) on Demographic Profile

Profile	Mean	Stat. Value	P-Value	Interpretation/ Decision
Age				
Below 18 years-old	3146.00	F = 0.80	0.52	Not significant/ Accept H0
18-21 years-old	3412.86			
22-24 years-old	4048.50			
Above 25 years-old	4098.50			
Sex				
Male	4241.88	t = 9.11	0.000	Significant/ Reject H0
Female	2690.43			
Regular Exercise	3844.00	F = 2.94	0.08	Not significant/ Accept H0
Occasional Exercise	3022.25			
Little Exercise	4232.00			
No Exercise	3586.00			

Table 5 provides a detailed comparison of pretest spirometry results, measured in milliliters (ml), across various demographic profiles. The spirometry test is a common measure of lung function, specifically assessing the volume of air that can be exhaled.

Starting with age, the table segments the data into four categories: below 18 years old, 18-21 years old, 22-24 years old, and above 25 years old. The average spirometry readings for these groups are 3146.00 ml, 3412.86 ml, 4048.50 ml, and 4098.50 ml, respectively. An F-statistic of 0.80 with a p-value of 0.52 suggests that the differences in lung capacity as measured by spirometry are not statistically significant across different age groups. Therefore, the null hypothesis (H0) that there is no difference is accepted for the age profile.

The analysis then addresses sex differences in spirometry results. The mean value for males is significantly higher at 4241.88 ml, compared to 2690.43 ml for females. With a t-statistic of 9.11 and a p-value of 0.000, these results are statistically significant, and the null hypothesis is rejected, indicating a significant difference in spirometry readings between males and females.

The final demographic profile evaluated is based on the subjects' regularity of exercise, divided into categories of regular exercise, occasional exercise, little exercise, and no exercise. The mean spirometry results for these groups are 3844.00 ml, 3022.25 ml, 4232.00 ml, and 3586.00 ml, respectively. The F-statistic is 2.94 with a p-value of 0.08, which borders on statistical significance. However, since the p-value is above the conventional threshold of 0.05, the differences are considered not significant, leading to the acceptance of the null hypothesis.

Similarly, from the analysis of the data in Table 5, it can be seen that there were no differences in the data of lung capacity when grouped by age and exercise experience awakening, except when conducted by gender, which showed variability in lung capacity. For the differences in spirometry by gender, it is related to the physiological differences between men and women, men are taller and have a relatively larger lung capacity, and men generally have a larger lung capacity than women, so the mean lung capacity spirometry is generally higher in men than in women.

Table 6. Differences in Pretest Sit-Up-And-Bend (cm) on Demographic Profile

Profile	Mean	Stat. Value	P-Value	Interpretation/ Decision
Age				
Below 18 years-old	10.80	F = 0.61	0.62	Not significant/ Accept H0
18-21 years-old	15.44			
22-24 years-old	13.00			
Above 25 years-old	11.45			
Sex				
Male	5.95	t = -1.08	0.30	Not significant/ Accept H0
Female	5.27			
Regular Exercise	16.70	F = 0.18	0.91	Not significant/ Accept H0
Occasional Exercise	13.74			
Little Exercise	12.02			
No Exercise	13.50			

Table 6 presents the analysis of pretest scores for a Sit-Up-And-Bend flexibility test across different demographic profiles. The scores are measured in centimeters (cm) and provide insights into the flexibility of the subjects before any intervention.

The age-related data is broken down into four groups:

below 18 years old, 18-21 years old, 22-24 years old, and above 25 years old. The average scores for these age brackets are 10.80 cm, 15.44 cm, 13.00 cm, and 11.45 cm, respectively. With an F-statistic of 0.61 and a p-value of 0.62, the differences in flexibility as indicated by the Sit-Up-And-Bend test among these age groups are not statistically significant. Consequently, the null hypothesis (H0), which posits no difference in flexibility across the age groups, is accepted.

When considering sex as a demographic factor, the means are quite close, with males averaging 5.95 cm and females 5.27 cm in the test. The t-statistic is -1.08 with a p-value of 0.30, suggesting that the difference in flexibility between males and females is also not statistically significant. Thus, the null hypothesis is accepted for sex as well.

Lastly, the table examines the differences based on the regularity of exercise, categorized as regular exercise, occasional exercise, little exercise, and no exercise. The mean scores are 16.70 cm, 13.74 cm, 12.02 cm, and 13.50 cm, respectively. An F-statistic of 0.18 with a p-value of 0.91 indicates no significant differences in the Sit-Up-And-Bend test results based on the frequency of exercise, leading to the acceptance of the null hypothesis in this category too.

In essence, Table 6 suggests that within this specific group of subjects, there are no significant differences in the Sit-Up-And-Bend test results when analyzed by age, sex, or exercise frequency. This could imply that these demographic factors do not have a distinct impact on the flexibility of individuals as measured by this test.

Sit-Up-And-Bend is mainly to determine the flexibility of the human body in a seated state, when the upper body is forward flexed, mainly reflecting the mobility of the hip and lumbar spine joints, and the larger the index indicates that the flexibility is better (Wang, 2018). Flexibility quality is the ability of the human body to carry out muscle activities over a long period of time, and it is also an important indicator of the level of human function and physical strength.

Table 7. Differences in Pretest 50-Meter dash (seconds) on Demographic Profile

Profile	Mean	Stat. Value	P-Value	Interpretation/ Decision
Age				
Below 18 years-old	9.45	F = 1.32	0.32	Not significant/ Accept H0
18-21 years-old	9.01			
22-24 years-old	8.05			
Above 25 years-old	8.55			
Sex				
Male	8.21	t = -7.45	0.000	Significant/ Reject H0
Female	9.77			
Regular Exercise	8.20	F = 1.82	0.20	Not significant/ Accept H0
Occasional Exercise	9.40			
Little Exercise	8.48			
No Exercise	8.30			

Table 7 examines the results of a pretest 50-Meter Dash, where the performance is measured in seconds, across different demographic profiles. The focus is on discerning whether demographic factors such as age, sex, and regular exercise impact the speed of the subjects.

For age, the subjects are categorized into four groups: below 18 years old, 18-21 years old, 22-24 years old, and above 25 years old. The respective mean times for these age groups are 9.45 seconds, 9.01 seconds, 8.05 seconds, and 8.55 seconds. The F-statistic is calculated at 1.32 with a p-value of 0.32, which indicates that the differences in the 50-Meter Dash times across these age groups are not statistically significant. Thus, the null hypothesis (H0), which asserts there is no variance, is accepted for age.

The sex demographic shows a substantial difference in performance. Males have a faster mean time of 8.21 seconds, while females have a slower mean time of 9.77 seconds. The t-statistic is quite high at -7.45 with a p-value of 0.000, which is highly significant. This leads to the rejection of the null hypothesis (H0), signifying a significant difference in the 50-Meter Dash times between males and females.

When considering the regularity of exercise, categorized as regular exercise, occasional exercise, little exercise, and no exercise, the mean times are 8.20 seconds, 9.40 seconds, 8.48 seconds, and 8.30 seconds, respectively. With an F-statistic of 1.82 and a p-value of 0.20, the table shows that the differences in times based on the level of regular exercise are not statistically significant, which results in the acceptance of the null hypothesis for this demographic.

Table 8. Differences in Pretest Standing Long Jump (cm) on Demographic Profile

Profile	Mean	Stat. Value	P-Value	Interpretation/ Decision
Age				
Below 18 years-old	163.75	F = 1.75	0.22	Not significant/ Accept H0
18-21 years-old	182.71			
22-24 years-old	203.50			
Above 25 years-old	202.50			
Sex				
Male	201.88	t = 4.76	0.000	Significant/ Reject H0
Female	161.57			
Regular Exercise	216.00	F = 2.52	0.11	Not significant/ Accept H0
Occasional Exercise	168.63			
Little Exercise	196.80			
No Exercise	197.00			

As mentioned in the Physical Fitness Test Standards for Chinese University Students, the purpose of the 50-meter run is to test the development of speed, agility and flexibility of

the nervous system of students, and the performance of the 50-meter run can comprehensively reflect the flexibility of the nervous process, the coordination of the body, the flexibility of the joints and muscles, as well as muscular strength and endurance. We cannot expect a person who is physically inflexible, muscularly weak, and has poor coordination and flexibility to achieve good results in the 50-meter dash. Therefore, the test score of the 50-meter run can partially reflect the comprehensive quality of body movement, but also the basic quality of the body that people must have to engage in sports activities and learn sports skills. It provides a good foundation for lifelong sports (Ministry of Education, 2023).

Table 8 presents the analysis of the pretest results for the Standing Long Jump, an event measuring explosive leg power, with results reported in centimeters (cm). The analysis seeks to understand how different demographic profiles affect performance in this physical test.

The demographic profiles are segmented by age, with four distinct groups: below 18 years old, 18-21 years old, 22-24 years old, and above 25 years old. The average jump distances for these groups are 163.75 cm, 182.71 cm, 203.50 cm, and 202.50 cm, respectively. An F-statistic of 1.75 with a p-value of 0.22 indicates that the variation in performance across these age groups is not statistically significant, leading to the acceptance of the null hypothesis (H0), which suggests there is no significant difference in the Standing Long Jump performance based on age

The sex category shows a significant disparity. Males have an average jump distance of 201.88 cm, considerably farther than females, who have an average distance of 161.57 cm. The t-statistic is 4.76 with a p-value of 0.000, which is highly significant, leading to the rejection of the null hypothesis (H0) for sex. This signifies a significant difference in the performance of the Standing Long Jump between male and female participants.

Finally, the impact of regular exercise on the Standing Long Jump is assessed. Categories include regular exercise, occasional exercise, little exercise, and no exercise, with mean distances of 216.00 cm, 168.63 cm, 196.80 cm, and 197.00 cm, respectively. The F-statistic is 2.52 with a p-value of 0.11, which, although suggestive of a possible trend, is not statistically significant by conventional standards ($p < 0.05$). Therefore, the null hypothesis is accepted, indicating that there is no significant difference in performance based on the regularity of exercise.

Vertical jump mainly reflects the subject's strength and flexibility qualities. In recent years, some studies have mentioned that standing long jump is an auxiliary means to develop jumping movement skills, coordination and leg strength. And by analyzing the influencing factors of standing long jump performance, so as to provide some theoretical reference basis for improving the quality of students' standing long jump training and improving students' standing long jump ability and performance (Si&Fang, 2022).

Table 9 delves into the pretest results of calisthenics, specifically the number of sit-ups and chin-ups completed in repetitions, examining the differences across demographic profiles including age, sex, and exercise frequency.

The age profile is split into four groups: below 18 years old, 18-21 years old, 22-24 years old, and above 25 years old. The mean number of repetitions for these age groups are 21, 15, 1, and 14, respectively. The F-statistic for age is 1.06 with a p-value of 0.41, suggesting that there is no statistically significant difference in the number of repetitions of sit-ups and chin-ups among the different age groups. Therefore, the null hypothesis (H0), which states there is no difference based on age, is accepted.

Table 9. Differences in Pretest Calisthenics - Sit Ups & Chin Ups (repetitions) on Demographic Profile

Profile	Mean	Stat. Value	P-Value	Interpretation/ Decision
Age				
Below 18 years-old	21	F = 1.06	0.41	Not significant/ Accept H0
18-21 years-old	15			
22-24 years-old	1			
Above 25 years-old	14			
Sex				
Male	4	t = -6.87	0.000	Significant/ Reject H0
Female	26			
Regular Exercise	14	F = 2.33	0.13	Not significant/ Accept H0
Occasional Exercise	21			
Little Exercise	6			
No Exercise	1			

When comparing the results by sex, there is a remarkable difference. Females outperform males with an average of 26 repetitions, while males average only 4 repetitions. The t-statistic is -6.87 with a p-value of 0.000, which is highly significant. Consequently, the null hypothesis (H0) is rejected for sex, indicating a significant difference in the performance of calisthenics between males and females in this sample.

The influence of regular exercise is also examined. The categories include regular exercise, occasional exercise, little exercise, and no exercise, with mean repetitions of 14, 21, 6, and 1, respectively. The F-statistic is 2.33 with a p-value of 0.13, which does not denote a statistically significant difference. Thus, the null hypothesis is accepted for regular exercise, suggesting that the frequency of exercise does not significantly influence the number of sit-ups and chin-ups repetitions.

The Chin Ups in the boys' test and the sit-ups in the girls' test are the main ways to reflect the subjects' muscular explosive force and strength endurance. There is relevant literature based on pull-up training in physical education, focusing on analyzing the impact of pull-up training on students' physical fitness, and using this to explore in-depth the training methods of pull-ups in physical education, aiming to further improve students' physical fitness (Chen, 2021). Another study pointed out that the lack of good exercise habits, exercise time cannot be guaranteed, and the intensity of exercise does not meet the requirements, is the main factor affecting the level of sit-ups of female college students (Zhang, 2019)

Table 10. Differences in Pretest Middle-Distance Running (Seconds) on Demographic Profile

Profile	Mean	Stat. Value	P-Value	Interpretation/ Decision
Age				
Below 18 years-old	271.00	F = 0.30	0.82	Not significant/ Accept H0
18-21 years-old	261.86			
22-24 years-old	267.50			
Above 25 years-old	273.00			
Sex				
Male	270.63	t = 0.98	0.35	Not significant/ Accept H0
Female	261.86			
Regular Exercise	274.00	F = 2.01	0.17	Not significant/ Accept H0
Occasional Exercise	258.00			
Little Exercise	279.40			
No Exercise	263.00			

Table 10 evaluates the differences in pretest times for middle-distance running, measured in seconds, across various demographic profiles to ascertain if certain groups perform differently from others in this athletic domain.

The age category is broken down into four groups: below 18 years old, 18-21 years old, 22-24 years old, and above 25 years old. The mean running times for these age groups are 271.00 seconds, 261.86 seconds, 267.50 seconds, and 273.00 seconds, respectively. The F-statistic is calculated at 0.30 with a p-value of 0.82, which suggests no statistically significant difference in middle-distance running times across the age groups. Therefore, the null hypothesis (H0), which posits no difference in performance due to age, is accepted.

Sex is the next demographic factor assessed. The mean time for males is 270.63 seconds and for females is 261.86 seconds. The t-statistic is 0.98 with a p-value of 0.35. Since this value is not below the commonly accepted threshold for significance ($p < 0.05$), the results indicate no statistically significant difference in running times between the sexes, leading to the acceptance of the null hypothesis for this demographic criterion as well.

Lastly, the impact of regular exercise on middle-distance running times is considered. The groups are segmented by regular exercise, occasional exercise, little exercise, and no exercise, with mean times of 274.00 seconds, 258.00 seconds, 279.40 seconds, and 263.00 seconds, respectively. An F-statistic of 2.01 with a p-value of 0.17 indicates that the differences in times based on the frequency of exercise are not statistically significant. Thus, the null hypothesis is accepted for the exercise frequency category.

Middle-Distance Running is the main way to test the endurance quality of college students, and the test data obtained from this will intuitively reflect the current situation of endurance quality in college students' physical fitness. In recent years, according to the test of "National Students' Physical Fitness", students' physical fitness has generally declined. Improving the cardiorespiratory endurance level of college students is the core element to solve the health problems of college students. Relevant studies have shown that subjective motivation plays an important role in cardiorespiratory endurance exercise. According to the teaching practice, based on running exercise, successful physical education guidance combined with specialized exercise prescription intervention, using reasonable methods to let students start from interest, can effectively promote college students to actively participate in exercise, improve cardiorespiratory endurance, and cultivate lifelong sports habits (Zhang, 2019).

Table 11. Assessment of Learning Experience – Exercise Frequency

Indicators	Mean	SD	Verbal Description/ Interpretation	Rank
I'm more involved in sports than I used to be.	3.67	0.49	Strongly Agree/ Very Satisfied	3
Sports have increased as a percentage of my life.	3.73	0.46	Strongly Agree/ Very Satisfied	1.5
I feel energized and stress-free by participating in the proper frequency of sports.	3.73	0.46	Strongly Agree/ Very Satisfied	1.5
I keep up my workouts three and more days a week.	3.53	0.52	Strongly Agree/ Very Satisfied	4
Exercise Frequency	3.67	0.40	Strongly Agree/ Very Satisfied	NA

Scale: 1-1.50: Strongly Disagree/Not Satisfied; 1.51-2.50: Disagree/Slightly Satisfied; 2.51-3.50: Agree/Satisfied; 3.51-4.00: Strongly Agree/Very Satisfied

Table 11 presents an assessment of participants' learning experiences in relation to their frequency of exercise. The assessment uses a Likert scale where indicators related to participants' involvement in sports and their perceptions of exercise are rated, and the table provides the mean scores, standard deviations (SD), and ranks of these indicators, along with a verbal description or interpretation for each.

The first indicator, "I'm more involved in sports than I used to be," has a mean score of 3.67 with a standard deviation of 0.49, and it is ranked third. The verbal description for this indicator is "Strongly Agree/Very Satisfied," suggesting that participants feel a significant increase in their sports involvement.

Next, "Sports have increased as a percentage of my life," shares the top rank with a mean score of 3.73 and a standard deviation of 0.46. Similarly, "I feel energized and stress-free by participating in the proper frequency of sports" also has a mean score of 3.73, an identical standard deviation of 0.46, and shares the number one rank. Both indicators have the verbal description "Strongly Agree/Very Satisfied," indicating a high level of satisfaction and agreement that sports occupy a larger part of participants' lives and contribute to their feeling of energy and stress relief.

The fourth indicator, "I keep up my workouts three and more days a week," has a slightly lower mean score of 3.53 and a standard deviation of 0.52, ranking it fourth. The description remains "Strongly Agree/Very Satisfied," which suggests that participants are consistent with their workout routines, maintaining them multiple times per week.

Lastly, the overall category of "Exercise Frequency" has a mean score of 3.67 with a standard deviation of 0.40, but no rank is assigned as it seems to serve as a cumulative measure of the exercise frequency aspect. The verbal interpretation is also "Strongly Agree/Very Satisfied," reflecting a positive overall sentiment towards the frequency of exercise among the participants.

Some scholars have pointed out that moderate-intensity exercise can significantly improve college students' strength, endurance, and cardiorespiratory fitness, and high-frequency moderate-intensity exercise improves these qualities and functional indexes even more significantly (Liu&Chen, 2019). It can be seen that the frequency of exercise is a factor that needs to be focused on to improve the physical quality of college students.

Table 12. Assessment of Learning Experience – Intensity of Exercise

Indicators	Mean	SD	Rank	Verbal Description/ Interpretation
I can reach 70% and more of my maximum heart rate while exercising.	3.60	0.51	2	Strongly Agree/ Very Satisfied
The day after my workout, I had some muscle reactions. (such as soreness, etc.)	3.47	0.52	3	Agree/Satisfied
I find the intensity of my current workout challenging, but any is within my control.	3.67	0.49	1	Strongly Agree/ Very Satisfied
It takes a certain amount of effort on my part to complete the tasks assigned in P.E. class.	3.40	0.63	4	Agree/Satisfied
Intensity of Exercise	3.53	0.44	NA	Strongly Agree/ Very Satisfied

Scale: 1-1.50: Strongly Disagree/Not Satisfied; 1.51-2.50: Disagree/Slightly Satisfied; 2.51-3.50: Agree/Satisfied; 3.51-4.00: Strongly Agree/Very Satisfied

Table 12 offers an assessment of participants' learning experiences in relation to the intensity of their exercise routines. The table details mean scores, standard deviations (SD), and ranks for various indicators of exercise intensity, accompanied by verbal descriptions or interpretations that reflect participants' agreement or satisfaction levels.

The first indicator, "I can reach 70% and more of my maximum heart rate while exercising," has a mean score of 3.60 and a standard deviation of 0.51, ranking second among the indicators. The verbal description is "Strongly Agree/Very Satisfied," which implies that most participants are able to achieve a vigorous level of intensity in their workouts as measured by heart rate.

Next, "The day after my workout, I had some muscle reactions (such as soreness, etc.)" scores a mean of 3.47 with a standard deviation of 0.52 and is ranked third. The corresponding verbal interpretation is "Agree/Satisfied," suggesting that participants generally experience the expected muscle reactions following their workout, indicating a sufficient level of exercise intensity.

The third indicator, "I find the intensity of my current workout challenging, but any is within my control," has the highest mean score of 3.67 with a standard deviation of 0.49 and is ranked first. This description, "Strongly Agree/Very Satisfied," reflects that participants feel the intensity is both challenging and manageable, which is an important aspect of a successful exercise regimen.

The statement "It takes a certain amount of effort on my part to complete the tasks assigned in P.E. class," receives a mean score of 3.40 and the highest standard deviation of 0.63, ranking it fourth. The verbal description "Agree/Satisfied" indicates a general consensus that participants must exert effort to complete physical education tasks, though the high standard deviation could suggest varied experiences among the participants.

Finally, "Intensity of Exercise" as an overall category has a mean score of 3.53 and a standard deviation of 0.44. No rank is given, likely because it serves as an aggregate measure of the intensity aspect. The verbal interpretation is "Strongly Agree/Very Satisfied," showing that, overall, participants feel positive about the intensity level of their exercise.

In recent years, the exercise intensity of college students has received more and more attention from China's Ministry of Education, which has also made some new requirements for the national physical education curriculum standards. Some researchers have made some interpretations of the "new curriculum standards", suggesting that: first of all, it is necessary to clarify the position of (medium-high) heart rate intensity in athletic training and physical education. Heart rate intensity belongs to internal physiological intensity, which is different from external specialized intensity, and is not a causal element or a direct sensitive indicator of external physical skill development; medium-high intensity mainly points to cardiorespiratory endurance (or cardiorespiratory fitness), and should be kept in reasonable tension with the value objectives of physical education, physical fitness development, sports development, moral education, and so on. Secondly, it is difficult and inappropriate to develop or propose a uniform intensity standard for each (whole) physical education class, but appropriate medium-high intensity time requirements can be proposed based on exercise effects such as cardiorespiratory endurance (Xiong, 2023).

Table 13. Assessment of Learning Experience – Participation

Indicators	Mean	SD	Rank	Verbal Description/ Interpretation
I always look forward to P.E. class.	3.53	0.52	3	Strongly Agree/ Very Satisfied
I always complete the learning tasks assigned by the teacher on time and in quantity.	3.53	0.52	3	Strongly Agree/ Very Satisfied
I was always active in sports and actively interacted with my classmates.	3.67	0.49	1	Strongly Agree/ Very Satisfied
Students in my neighborhood are actively participating in sports.	3.60	0.51	2	Strongly Agree/ Very Satisfied
Participation	3.58	0.41	NA	Strongly Agree/ Very Satisfied

Scale: 1-1.50: Strongly Disagree/Not Satisfied; 1.51-2.50: Disagree/Slightly Satisfied; 2.51-3.50: Agree/Satisfied; 3.51-4.00: Strongly Agree/Very Satisfied

Table 13 provides a quantified assessment of participants' attitudes and behaviors towards participation in physical education (P.E.) and sports activities. This assessment comprises various indicators, each with a mean score, standard deviation (SD), and rank, as well as a verbal description or interpretation that reflects the level of agreement or satisfaction.

The first indicator is "I always look forward to P.E. class," which has a mean score of 3.53 and a standard deviation of 0.52, ranking third among the indicators. The verbal interpretation "Strongly Agree/Very Satisfied" suggests a high level of anticipation and positive sentiment toward P.E. classes among the participants.

The second indicator, "I always complete the learning tasks assigned by the teacher on time and in quantity," also has a mean of 3.53 with an identical standard deviation of 0.52, and shares the third rank. The same verbal description "Strongly Agree/Very Satisfied" indicates that participants are diligent in completing their assignments, showing good compliance with the tasks set by their educators.

"I was always active in sports and actively interacted with my classmates," the indicator ranked first, scores a mean of 3.67 with a standard deviation of 0.49. This top ranking and the verbal description "Strongly Agree/Very Satisfied" reflect the highest level of active participation and social interaction in sports among the participants.

The fourth indicator, "Students in my neighborhood are actively participating in sports," has a mean score of 3.60 and a standard deviation of 0.51, ranked second. The description "Strongly Agree/Very Satisfied" suggests that participants perceive a high level of sports engagement in their local community.

Lastly, the overall category "Participation" has a mean score of 3.58 with a standard deviation of 0.41. No specific rank is assigned, indicating that it may represent an overall assessment of participation. The verbal interpretation remains "Strongly Agree/Very Satisfied," denoting a positive overall experience with participation in the context assessed.

In recent years, some related studies have raised concerns about the physical fitness status and sports participation of college students in Chinese universities, which are mainly reflected in the following aspects: firstly, there is insufficient knowledge about sports and they do not appreciate the many benefits of participating in sports activities; secondly, some of the college students who are able to take the initiative to participate in sports activities have difficulties in achieving a good exercise effect in terms of frequency and intensity (Duan, 2019).

Table 14. Assessment of Learning Experience – Diversity in Sports Content

Indicators	Mean	SD	Rank	Verbal Description/ Interpretation
I have experienced many types of physical fitness methods in my P.E. class.	3.60	0.51	3	Strongly Agree/ Very Satisfied
My learning and movement in gym class extends to after school.	3.73	0.46	1	Strongly Agree/ Very Satisfied
Physical activity extends into my daily studies and life.	3.67	0.49	2	Strongly Agree/ Very Satisfied
Experienced at least 3 or more forms of exercise for each physical quality (e.g., strength, endurance, flexibility).	3.67	0.49	2	Strongly Agree/ Very Satisfied
Diversity in Sports Content	3.67	0.44	NA	Strongly Agree/ Very Satisfied

Scale: 1-1.50: Strongly Disagree/Not Satisfied; 1.51-2.50: Disagree/Slightly Satisfied; 2.51-3.50: Agree/Satisfied; 3.51-4.00: Strongly Agree/Very Satisfied

Table 14 presents data from an evaluation of participants' experiences with the diversity of sports content in their physical education (P.E.) classes. The table lists several indicators along with their mean scores, standard deviations (SD), and ranks, which are then interpreted using a verbal description scale that ranges from "Strongly Disagree/Not Satisfied" to "Strongly Agree/Very Satisfied."

The first indicator, "I have experienced many types of physical fitness methods in my P.E. class," has a mean score of 3.60 and a standard deviation of 0.51, ranking third. The verbal interpretation of "Strongly Agree/Very Satisfied" indicates that participants feel they have been exposed to a

wide variety of physical fitness methods in their P.E. classes.

Next, the indicator "My learning and movement in gym class extends to after school" scores the highest with a mean of 3.73 and a standard deviation of 0.46, ranked first. The strong agreement and high level of satisfaction suggest that the impact of gym class extends beyond school hours into the participants' personal time.

The statement "Physical activity extends into my daily studies and life" has a mean score of 3.67, a standard deviation of 0.49, and shares the second rank with the next indicator. Similarly, "Experienced at least 3 or more forms of exercise for each physical quality (e.g., strength, endurance, flexibility)" also has a mean of 3.67 and a standard deviation of 0.49, with a rank of 2. Both indicators are interpreted as "Strongly Agree/Very Satisfied," which signifies that the participants not only experience a diverse range of physical activities but also integrate these activities into their daily routines and recognize the benefits across various aspects of physical fitness.

Lastly, the overall category "Diversity in Sports Content" has a mean score of 3.67 and a standard deviation of 0.44. No specific rank is given, which implies it is an aggregate measure of the diversity aspect. The verbal description is "Strongly Agree/Very Satisfied," reflecting a highly positive overall sentiment towards the diversity of the sports content encountered by the participants.

Table 15. Assessment of Learning Experience – Psychological Development

Indicators	Mean	SD	Rank	Verbal Description/ Interpretation
I am more cheerful than before and more willing to share the joy of exercise with my classmates and friends.	3.40	0.63	2	Agree/ Satisfied
I think gym class has gotten a lot more interesting.	3.53	0.52	1	Strongly Agree/ Very Satisfied
I got into one or more sports.	3.27	0.70	4	Agree/ Satisfied
P.E. class got me into the habit of exercising regularly.	3.40	0.51	2	Agree/ Satisfied
Psychological Development	3.40	0.52	NA	Agree/ Satisfied

Scale: 1-1.50: Strongly Disagree/Not Satisfied; 1.51-2.50: Disagree/Slightly Satisfied; 2.51-3.50: Agree/Satisfied; 3.51-4.00: Strongly Agree/Very Satisfied

Table 15 outlines the results of an assessment focusing on the psychological development aspect of participants' learning experiences in physical education (P.E.). It showcases the impact of P.E. classes on students' psychological states and attitudes toward sports and exercise. The table provides mean scores, standard deviations (SD), and ranks for a set of indicators, each accompanied by a verbal interpretation ranging from "Agree/Satisfied" to "Strongly Agree/Very Satisfied."

The first indicator, "I am more cheerful than before and more willing to share the joy of exercise with my classmates and friends," has a mean score of 3.40 with a standard deviation of 0.63, ranked second. The verbal description "Agree/Satisfied" suggests that participants generally feel an increased sense of happiness and sociability associated with exercise.

"I think gym class has gotten a lot more interesting" is the highest-ranked indicator with a mean of 3.53 and a standard deviation of 0.52, receiving the verbal interpretation "Strongly Agree/Very Satisfied." This indicates a strong positive shift in the participants' interest level regarding gym class.

The statement "I got into one or more sports" has a mean score of 3.27 and the highest standard deviation of 0.70, ranking it fourth. Despite being the lowest-ranked indicator, the verbal description "Agree/Satisfied" reflects a general trend of participants becoming engaged in various sports.

The fourth indicator, "P.E. class got me into the habit of exercising regularly," shares the second rank with a mean score of 3.40 and a standard deviation of 0.51. The description "Agree/Satisfied" indicates that P.E. classes have been successful in instilling a habit of regular exercise among the participants.

Finally, the overall category "Psychological Development" has a mean score of 3.40 and a standard deviation of 0.52. Although not assigned a specific rank, it seems to serve as a cumulative measure of the psychological benefits attributed to P.E. classes. The verbal interpretation "Agree/Satisfied" points to a positive overall psychological impact on the participants.

Table 16. Summary of Assessed Learning Experience

Indicators	Mean	SD	Rank	Verbal Description/ Interpretation
Exercise Frequency	3.67	0.40	1	Strongly Agree/ Very Satisfied
Intensity of Exercise	3.53	0.44	4	Strongly Agree/ Very Satisfied
Participation	3.58	0.41	3	Strongly Agree/ Very Satisfied
Diversity in Sports Content	3.67	0.44	1	Strongly Agree/ Very Satisfied
Psychological Development	3.40	0.52	5	Agree/ Satisfied
Learning Experience	3.57	0.39	NA	Strongly Agree/ Very Satisfied

Scale: 1-1.50: Strongly Disagree/Not Satisfied; 1.51-2.50: Disagree/Slightly Satisfied; 2.51-3.50: Agree/Satisfied; 3.51-4.00: Strongly Agree/Very Satisfied

The help of physical education and sports on mental health has been widely recognized by the society. In recent years, the development of mental health has gradually become a concern in the reform of physical education programs in

colleges and universities. Some scholars have conducted an empirical study on the development of students' mental health during the implementation of "Baduanjin" martial arts teaching in colleges and universities. After 12 weeks of practicing "Baduanjin" in physical education class, students' mental health level changed significantly, indicating that the practice of "Baduanjin" can greatly improve students' mental health. The practice of "Ba Duan Jin" in physical education class can effectively relieve students' psychological pressure, and the practice of "Ba Duan Jin" has a positive effect on the regulation of physical and mental health.

Table 16 synthesizes the results of an evaluation of participants' learning experiences in various aspects of a physical education program. The table consolidates the findings from different indicators into a summary form, each with a mean score, standard deviation (SD), and rank, accompanied by a verbal interpretation to express the level of agreement or satisfaction among the participants.

The indicator "Exercise Frequency" scores a mean of 3.67 with a standard deviation of 0.40, tying for the highest rank at number 1. This score, interpreted as "Strongly Agree/Very Satisfied," indicates that participants feel positively about the frequency of their exercise routines and are very satisfied with this aspect of their physical education experience.

"Intensity of Exercise" has a mean score of 3.53 and a standard deviation of 0.44, ranked fourth. Despite being lower in rank, the verbal description "Strongly Agree/Very Satisfied" suggests that participants still find the intensity of their exercises to be satisfying and agreeable.

The "Participation" indicator, with a mean of 3.58 and a standard deviation of 0.41, is ranked third. The strong agreement and satisfaction suggest that participants are actively engaged and content with their level of participation in the physical education program.

"Diversity in Sports Content" also scores a mean of 3.67 with a standard deviation of 0.44, sharing the top rank with "Exercise Frequency." The "Strongly Agree/Very Satisfied" interpretation reflects a high level of approval for the variety of sports and activities offered within the program.

"Psychological Development" receives the lowest mean score of 3.40 and the highest standard deviation of 0.52, ranking it fifth. The verbal description "Agree/Satisfied" indicates that while participants are generally satisfied with the psychological benefits of their P.E. classes, there is slightly less consensus in this area compared to others.

Lastly, the overall "Learning Experience" has a mean score of 3.57 and a standard deviation of 0.39. No rank is provided, suggesting it is an overall assessment. The interpretation "Strongly Agree/Very Satisfied" suggests that participants view their learning experience in the physical education program favorably across all measured aspects.

It is necessary to investigate and pay attention to the physical education learning experience of the respondents; the ultimate goal of physical education teaching is to make students actively participate in sports and develop the habit of lifelong physical exercise. Therefore, focusing on the subjective experience of students' participation in physical education program learning is an important step to stay close to the research topic and the purpose of the study. A similar concern has been raised in a related study, in which the researcher argues that the results of college physical fitness tests in recent years have presented a clear trend of declining physical fitness among college students, and their health has been affected. Physical education classes in colleges and universities play a key role as a way to focus on exercise, and the satisfaction evaluation produced by students as the main body is an important indicator of teaching quality assessment. The researcher analyzes from the perspectives of teachers, students, methods, contents, hardware facilities, atmosphere and process that affect students' learning satisfaction in college physical education classes, with a view to providing corresponding reference value for improving the teaching quality of physical education classes in colleges and universities and enhancing students' learning satisfaction in physical education classes (Qin, 2023).

Table 17. Comparison of Pretest and Posttest Physical Fitness After the Intervention (Paired T-Test)

Physical Fitness Test	Mean Difference	T-Value	P-Value	Interpretation/ Decision
Height	0.01	0.37	0.72	Not significant/ Accept H0
Weight	0.46	0.64	0.53	Not significant/ Accept H0
Spirometry	-328.80	-9.12	0.00	Significant/Reject H0
Sit-Up-And-Bend	-2.45	-5.33	0.00	Significant/Reject H0
50-Meter Dash	0.51	14.66	0.00	Significant/Reject H0
Standing Long Jump	-9.67	-7.45	0.00	Significant/Reject H0
Calisthenics - Sit Ups & Chin Ups	-5.00	-7.10	0.00	Significant/Reject H0
Middle-Distance Running	7.80	9.34	0.00	Significant/Reject H0

Table 17 provides a statistical analysis comparing pretest and posttest results of physical fitness measurements after an intervention, using a paired t-test to determine the significance of any changes observed.

The first row examines changes in height, showing an almost negligible mean difference of 0.01, with a t-value of 0.37 and a p-value of 0.72. This indicates no significant change in height following the intervention, leading to the acceptance of the null hypothesis (H0), which suggests no effect.

Weight changes show a mean difference of 0.46, with a t-value of 0.64 and a p-value of 0.53. Like height, this change is not statistically significant, so the null hypothesis that the intervention did not affect weight is accepted.

Spirometry, which measures lung capacity, shows a substantial mean difference of -328.80. With a t-value of -9.12 and a p-value of 0.00, this change is statistically significant, and the null hypothesis is rejected, indicating that the intervention increased significantly the spirometry results.

The Sit-Up-And-Bend test, assessing flexibility and core strength, has a mean difference of -2.45. The t-value is -5.33 with a p-value of 0.00, which is also statistically significant, leading to the rejection of the null hypothesis for this physical fitness test. This result indicates that after the experimental intervention, the posttest results significantly increased the distance of sit-up-and-bend and performance was significantly improved.

The 50-Meter Dash results show a mean decrease in time of 0.51 seconds, with a t-value of 14.66 and a p-value of 0.00, indicating participants ran faster post-intervention. This significant change results in rejecting the null hypothesis. The results of the data analysis showed that after the intervention, the subjects were on average 0.51 seconds faster in the 50-

meter dash , which is a significant performance improvement in the sprint event. It shows that after the experimental intervention, the subjects' speed in 50-meter dash running was significantly improved.

For the Standing Long Jump, the mean difference is -9.67, with a t-value of -7.45 and a p-value of 0.00. This significant increase in jumping distance post-intervention leads to the rejection of the null hypothesis. Through the results we can learn that the average increase in standing long jump distance after the intervention was 9.67 centimeters, indicating that the respondents' standing long jump performance was significantly improved after a period of experimental intervention.

Calisthenics, measured by the number of sit-ups(girl's program) and chin-ups(boy's program), shows the mean difference is -5.00, with a t-value of -7.10 and a p-value of 0.00, indicating a significant increase in repetitions post-intervention and the null hypothesis is rejected. From this result, it is known that the respondents got a significant increase in the number of repetitions of sit-ups(girl's program) and chin-ups(boy's program) after the intervention and their performance was significantly improved.

Finally, the Middle-Distance Running test(800 meters for girls and 1000 meters for boys) shows a mean decrease in time of 7.80 seconds, suggesting participants took shorter time to complete the distance post-intervention. The t-value of 9.34 and a p-value of 0.00 are significant, resulting in the rejection of the null hypothesis. This result showed that the respondents ran an average of 7.8 seconds faster in completing the required distance in the middle-distance running test after receiving the intervention, indicating a significant improvement in the subjects' middle distance running performance after a period of intervention.

In conclusion, Table 17 reveals that the intervention had a statistically significant impact on all physical fitness tests except for height and weight. The significant increase in Spirometry and the speed of Middle-Distance Running indicated that the subjects' endurance quality had been significantly improved; the significant increase in the number of repetitions of Sit-ups and Chin-ups, the significant increase in the distance of Standing Jump Long, and the significant decrease in the time needed for 50-meter Dash indicated that the subjects' strength quality had been significantly improved; The significant increase in the distance of Standing Long Jump also showed that the subjects improved their physical coordination ability; The Sit-Up-And-Bend increased significantly, indicating that the subjects' flexibility quality was improved more obviously.

8. Conclusion

1. The age range of the subjects varied, with a slight majority in the 19-20 age group; the gender distribution of the subjects was more balanced, with slightly more males; and the subjects had varying degrees of exercise experience, with the majority of them only participating in occasional exercise in their spare time.

2. The physical fitness of the subjects was at an intermediate level with no major differences. The physical fitness of the subjects was not specific and provided a better experimental sample for the experimental intervention, and the level of physical fitness of the study sample tended to be consistent.

3. The physical fitness of the subjects was at an intermediate level with no major differences. The physical fitness of the subjects was not specific and provided a better experimental sample for the experimental intervention, and the level of physical fitness of the study sample tended to be consistent.

4. Respondents who used informatics as an intervention to assess their learning experience showed a high level of acceptance and satisfaction in five areas: frequency of exercise, intensity of exercise, participation in exercise, variety of teaching content, and psychological development.

5. The subjects' physical fitness test results before and after the informational intervention learning experience showed significant differences except for height and weight.

6. Through this study, a multi-dimensional informationized physical education teaching model is constructed relying on the Internet teaching platform and communication platform and AI-assisted teaching software.

9. Recommendations:

1. Building the "Wisdom Tree" curriculum teaching platform, integrating sports theoretical knowledge and scientific guidance, and triggering students' sports thinking. Adapt to the development trend of teaching, Can utilizes the "Wisdom Tree" teaching platform to integrate sports theories, prevention and treatment of sports injuries, scientific training methods and other sports-related knowledge, and combines them with the traditional sports classroom by means of blended teaching and flipped classroom, so as to guide the students to self-reflection, change from passive acceptance of knowledge to active thinking, learn from their own characteristics and needs, and cultivate students' sports thinking in a purposeful, planned and targeted manner.

2. Building an Internet communication platform to open up new ways for teachers and students to teach and communicate. WeChat is a popular Internet communication platform for college students and has a high usage rate among the student population. Schools can organize student who is good at sports to shoot and produce "college students' physical fitness guidance video collection", combined with course-related text, pictures, audio, video and other multimedia resources, after collection, collation and generalization, with the help of "sports micro classroom " WeChat Information Push Platform real-time push to the students, for students' physical fitness exercise to provide scientific practice methods and guidance. Students can take what they need according to their personal physical characteristics and carry out targeted exercise and learning. The "Sports Micro classroom" WeChat Information Push Platform not only provides sports learning resources customized for this course, but also provides sports injury prevention and treatment, first aid methods, sports nutrition and other expanded knowledge. On "Sports Micro Classroom", students can realize targeted learning anytime, anywhere, and provide real-time feedback on their learning; teachers can process and feedback students' applications or questions in real time, and supervise and guide students in their learning process, which opens up an efficient way for teachers and students to teach and communicate with each other.

3. Introducing AI-assisted teaching software to enrich teaching content and stimulate learning enthusiasm. "The "Daily Jump Rope" APP is a mobile intelligent sports software, and its "Body Intelligence Cloud" teaching platform has rich sports content and novel AI sports learning methods. The "Body Intelligence Cloud" teaching platform combines AI motion capture, fitness training and creative interactions

with each other, without the need for specific sports venues and equipment, only need to let the cell phone camera to point at themselves, With the software's AR-assisted features, you can carry out sports under the guidance of science at any time and anywhere. Teachers through the "Body Intelligence Cloud" teaching platform, according to the characteristics of the curriculum and teaching plan, scientific planning of sports content, set up innovative learning tasks, students in the class after the completion of the practice tasks, and under the scientific supervision and guidance to expand the content of physical exercise, the formation of the "guided practice-following practice-expansion practice This forms a learning model of "guide practice - follow practice - expand practice". In addition, the teacher can regularly launch small online competitions through the "Body Intelligence Cloud" teaching platform to stimulate students' enthusiasm for sports, assess students' learning effect, and cultivate students' sportsmanship of perseverance, hard work and aggressiveness. The use of this platform has enriched the teaching content, stimulated students' enthusiasm for learning, improved learning results, and opened up new areas for high-quality and efficient teaching of physical education courses.

4.Constructing an informationalized multidimensional physical education teaching model that combines in time and space. The multidimensional physical education teaching model of information technology is an innovative teaching model that flexibly arranges teaching in time and space dimensions.

References

[1] Akçayır, M., & Akçayır, G. (2017). Advantages and challenges associated with augmented reality for education: A systematic review of the literature. Educational Research Review, 20, 1-11.

[2] Al-Azawei, A., et al. (2017). Blended learning adoption during the COVID-19 pandemic: A case study of higher education institutions. Heliyon, 6(12).

[3] Archer, E., Lavie, C. J., Hill, J. O., et al. (2019). Physical inactivity is associated with increased risk for mortality in people with mental illness. The Journal of Physical Activity and Health, 16(3), 159-166.

[4] Chen, W., et al. (2018). The development of information technology literacy for physical education teachers in China. Technology, Knowledge and Learning, 23(3), 437-454.

[5] Ehlers, U. D., et al. (2019). Blockchain in education: A critical review. International Journal of Educational Technology in Higher Education, 16(1).

[6] Ertmer, P. A., et al. (2019). Teacher beliefs and technology integration practices: A critical relationship. Computers & Education, 128, 65-74.

[7] Hamer, M., & Stamatakis, E. (2019). Physical activity and risk of cardiovascular disease events: Inflammatory and metabolic mechanisms. Medicine & Science in Sports & Exercise, 51(3), 1598-1601.

[8] Khan, K. M., Thompson, A. M., Blair, S. N., et al. (2020). Sport and exercise as contributors to the health of nations. The Lancet, 380(9836), 59-64.

[9] Luckin, R., et al. (2018). AIED in the classroom: What works and why. In International Handbook of the Learning Sciences (pp. 371-382). Routledge.

[10] Makransky, G., et al. (2017). The effect of VR-based simulation on students' motivation and learning in a university physical education classroom. Computers & Education, 106, 192-205.

[11] Martins, J., Marques, A., Sarmento, H., et al. (2020). Associations between body image, nutritional supplement use, and attitudes towards doping in sport among adolescent athletes. International Journal of Environmental Research and Public Health, 17(7), 2267.

[12] Nguyen, M., Grzywacz, J. G., Lang, W., et al. (2020). Associations of work stress, supervisor unfairness, and supervisor inability to speak Spanish with occupational injury among Latino farmworkers. Journal of Occupational and Environmental Medicine, 62(6), e269-e276.

[13] Peng, H. (2019). Gamified learning in physical education: A systematic review. Interactive Learning Environments, 1-12.

[14] Sallis, J. F., Cerin, E., Conway, T. L., et al. (2019). Physical activity in relation to urban environments in 14 cities worldwide: A cross-sectional study. The Lancet, 387(10034), 2207-2217.

[15] Sclater, N. (2019). Learning analytics explained. Routledge.

[16] Smith, L., Gardner, B., & Aggio, D. (2018). Evidence on the relationship between academic achievement and the quality of schools: A review. Public Health, 15(4), 732.

[17] Tene, O., & Polonetsky, J. (2019). Privacy in the age of big data: A time for big decisions. Stanford Law Review Online, 66, 65-73.

[18] Van Dijk, J. (2020). The digital divide. MIT Press.

[19] Van Rossum, T., et al. (2021). Effects of using wearable technology and goal setting to increase physical activity in overweight adolescents. Journal of Physical Education and Sport, 21(2), 584-591.

[20] Wang, Q., & Liu, X. (2021). The relationship between college students' physical activity behavior and their perceived academic stress and self-efficacy during the COVID-19 pandemic. Frontiers in Psychology, 12, 648175.

[21] Warner, L., et al. (2020). FitBits for fun? A study of how fitness trackers affect physical activity and engagement in a college physical activity course. Journal of Teaching in Physical Education, 39(1), 3-9.

[22] White, R. L., Babic, M. J., Parker, P. D., et al. (2021). Domain-specific physical activity and health-related quality of life in university students. Journal of Sport and Exercise Psychology, 43(3), 211-223.

[23] Xiong, Y., et al. (2020). Data analytics for online education: Identifying online students at risk of poor performance. Internet and Higher Education, 45.

[24] Yin, Z., Sun, Z., Zhang, H., et al. (2022). A school-based physical activity intervention among Chinese college students: Rationale, design, and baseline findings from the U-Lean study. Contemporary Clinical Trials, 111, 106648.

[25] Zhang, Y., Xue, Y., Li, Z., et al. (2019). The relationship between physical activity, anxiety, and depression in college students. Medicine & Science in Sports & Exercise, 51(9), 1906-1911.