



Physical Movement Monitoring Method of College Physical Education Students Based on Genetic Algorithm

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Abstract. In order to better improve the physical fitness and comprehensive quality of college physical education students, this paper puts forward the physical fitness mobile monitoring method of college physical education students based on genetic algorithm, constructs the physical fitness evaluation index of college physical education students combined with genetic algorithm, optimizes the physical fitness monitoring management algorithm of College physical education students, optimizes the physical fitness mobile monitoring equipment of college physical education students, and simplifies the monitoring process, improve the physical fitness monitoring accuracy of college physical education students. Finally, the experiment proves that the physical fitness movement monitoring method of college physical education students based on genetic algorithm has high practicability and fully meets the research requirements.

Keywords: Genetic algorithm · College physical education · Physical movement monitoring

1 Introduction

As an important type of higher education in our country, colleges not only have the attribute of higher education, but also have the attribute of vocational education. How to train high quality and high skill applied talents according to social needs, vocational characteristics and students' characteristics is the starting point and goal of colleges. The quality of talents training is the lifeline of colleges and the main body of connotation development. With the reform and popularization of vocational physical education in colleges all over the country, vocational teaching quality evaluation system has gradually formed.

College Students' physical exercise monitoring is an important link in sports training, which is helpful to analyze students' body shape and sports ability and guide teachers' specific teaching arrangements. At present, literature [1] proposes a human motion monitoring method based on flexible pressure sensors. A flexible high-sensitivity resistance pressure sensor is fabricated, and the designed strain coefficient is 3.5. According to

the sensor array data such as finger bending, arm bending, throat vibration and pulse vibration, the human motion posture is judged. With the help of the acquisition circuit, the change of internal resistance caused by the force of the sensor is displayed on the computer in real time to monitor the human motion state. Document [2] proposes a method for dynamic target detection of human motion with multiple degrees of freedom. The Gaussian background model is constructed to separate the background area and the target area of the image, and the target area is transformed into HSI space; Combining the small area removal method and mathematical morphology processing, the shadow in the target area is determined according to the characteristics of high saturation and low brightness of the shadow area; The shadow part in the target area is removed by matching compensation to realize multi degree of freedom human motion monitoring.

The monitoring management algorithm of the above method is insufficient, and the monitoring results have low accuracy. Therefore, the monitoring method of physical movement based on genetic algorithm is proposed. Based on the genetic algorithm, the physical fitness evaluation index is constructed, and it improves the monitoring algorithm and physical monitoring accuracy.

2 Monitoring Method of Physical Fitness Movement of College Physical Education Students

2.1 Physical Fitness Monitoring Indicators of College Physical Education Students

The construction of students' physical fitness test and evaluation system can effectively improve students' physical quality and develop their physical ability in an all-round way: they can reasonably form good habits and form healthy lifestyle [3]. Have a healthy body. Therefore, the construction of student teaching quality evaluation index is not only the need of teaching technology, but also the goal of physical education and health courses in colleges. Based on the characteristics of sports events, the author holds that "students' special physical ability refers to their ability to bear the load and adapt to the changes of environment in sports, and is the comprehensive embodiment of specialization in the aspects of students' body form, body function and sports quality", which constitutes the body form, body function and sports quality of physical energy structure, and each has its own independent function, mutual restriction and mutual influence [4]. From the functional point of view, physical form and function are the material basis of physical energy. Athletic quality is the external expression of physical energy and the core of physical energy. Body shape and body function are the guarantee conditions to improve sports quality. Analyzed from the interaction, the body shape and the body function affect the sports quality, conversely, the sports quality directly affects the body shape and the body function; the body function affects the body shape, but the body shape will have a minor influence on the body function. It can be seen that the students' special physical ability can be regarded as a multi-dimensional and multi-level organic system composed of body form, body function and sports quality. Any one of the elements of the problem will affect the functioning of the entire system. The architecture for assessing physical fitness is shown in Fig. 1.

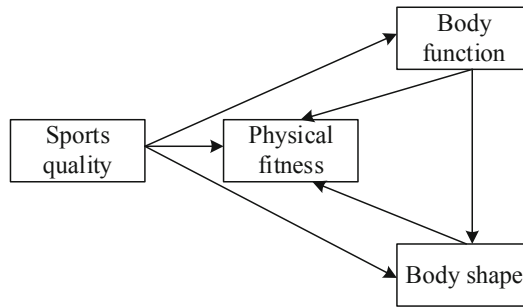


Fig. 1. Architecture for assessing fitness

As can be seen from Fig. 1, the ultimate goal of education is to cultivate useful talents for society. Students in colleges should have the skills for their posts, the appropriate knowledge and the quality for social development [5]. Physical education curriculum has been listed as the school's public basic courses, if viewed from a single health objective, this is understandable. Sports, as a skills-oriented project, is the player's skill ability to achieve excellent results in training and competition, so the final evaluation of students' physical education quality must serve the improvement of students' technical level. Nowadays, the application and development of fast rhythm, strong rotation and mixed multiple technical movements undoubtedly put forward higher requirements for students' physical function and sports quality. And these special requirements, only by special sports technology is impossible to achieve, only through a systematic evaluation of the quality of special sports teaching to meet [6]. The relationship between sports skills and the evaluation of sports teaching quality is shown in Table 1.

Table 1. Relationship between sports skills and physical education quality evaluation

Technical factors	Physical factors
Control technology of body posture	Muscle strength produced by forced static contraction of neck, shoulder, arm, trunk, waist and crotch and other muscle groups; The neck, chest and waist muscles exert force, and the flexibility of women's neck, chest and waist in standard dance
Fast and bouncing technology of body center of gravity	The calf muscle group's degenerative contraction and centripetal contraction force - muscle endurance; Degenerative contraction and centripetal contraction of human leg muscles (force) - muscle endurance; Ankle - I - flexibility
The technique of strong twisting and swinging of the thigh and waist and abdomen	Coordinated exertion of hip, waist and abdominal muscles - muscle endurance, coordination and flexibility of medullary joints
Rhythmic technique of chest, back, shoulder and arm	Trapezius muscle strength, deep back muscle strength - muscle endurance and coordination; The lower arm muscles exert the flexibility of a joint and the rapid strength of muscles
Continuous movement of the body	Reaction speed (resilience on the dance floor) - sensitivity

As can be seen from Table 1, good special physical ability is the basis for students to complete all kinds of special technical movements. Therefore, only by systematically evaluating the quality of special sports teaching and promoting the comprehensive and coordinated development of students' organizations, organs and systems, can students master more complicated, advanced and reasonable sports techniques.

The evaluation index of PE teaching quality is based on the professional post [7]. Most of the students take up their posts directly after graduation. The employment rate of their majors is high. Therefore, the goal of teaching quality evaluation in colleges should rest on urging and improving the realization of the goal of physical education. The aim is to promote the students to do physical exercises actively by analyzing the physical condition of the students in different ages and combining the characteristics of their employment in the future; Promote the students to do physical exercises actively and actively by monitoring the changes in the physical condition of the students in the process of physical exercises; Train the students to learn the ability and habit of monitoring the physical condition of themselves or others step by step, and train the students to do physical exercises purposefully according to their majors so as to meet the needs of future work.

2.2 Algorithm for Student Teaching Quality Evaluation

In the teaching of physical education in colleges and universities, the design of the evaluation algorithm of teaching quality plays an important role. Therefore, the evaluation content must be comprehensive and systematic, the evaluation methods must be diversified, and the learning attitude in the learning process and its learning effects can be systematically evaluated, and be combined with the teaching objectives in each stage, so as to fully embody the role of the evaluation. The evaluation of physical education quality, as an important content of physical education, should naturally be embodied in the teaching evaluation. As a teacher in colleges and universities, the evaluation must be stimulated as a means to stimulate students' learning enthusiasm, and the individual differences of students must be fully taken into account, so as to guarantee the objectivity and effectiveness of the evaluation. The content involved in the physical education evaluation may include the following points: For example, the improvement of students' learning attitude, the physical quality and fitness level of students, the combination of the vertical and horizontal evaluation methods, and the positive role of the evaluation of physical education quality in the teaching of physical education [8, 9]. The establishment of evaluation system is a highly technical and wide-ranging work. In order to ensure the orderly process of the preparation of evaluation system and make the content of indicators and standards reach a relatively ideal level, certain scientific procedures and technologies must be adopted for operation. To establish an evaluation system, the following four steps are usually adopted: determine the evaluation object and target, determine the evaluation index system, determine the branch weight of the evaluation index, and design the evaluation criteria. The specific content is shown in Fig. 2.

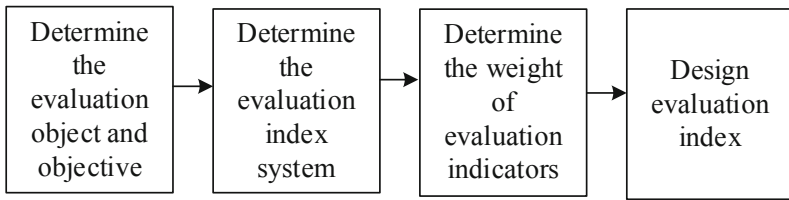


Fig. 2. Evaluation System

As shown in Fig. 2, the evaluation usually adopts the following four steps: determining the evaluation object and goal, determining the evaluation index system, determining the weight of evaluation index and designing evaluation standard.

Questionnaires were distributed to 12 relevant experts, who were asked to assign the importance of indicators of each level by adopting the five-grade scoring method in combination with their characteristics, and the relative assignment of indicators i by experts J was calculated as follows:

$$w_{ij} = \frac{p_{ij}}{\sum_{k=1}^m p_{kj}} - m \quad (1)$$

In the above expression, p_{ij} represents the assignment of expert j to the first index i , p_{kj} represents the assignment of expert j to the first index k , and m represents the number of the first index. Find the weight coefficient of index i

$$w_i = \frac{1}{12} \sum_{j=1}^m w_{ij} \quad (2)$$

After confirming the body shape, body function and sports quality, we can determine the first and second indexes of the model, but there are many other indexes under the model. If we select them all, the calculation will be increased, which is not conducive to the impact assessment. Therefore, it is necessary to select the indexes. This section adopts the expert interview method to select the third index. The selected indexes are shown in Table 2.

Table 2. Model indicators selected

Primary index	Secondary index	Tertiary indicators
Physical fitness changes of athletes	Body shape	Height, dimension and weight
	Physical function	Biochemical indexes, cardiopulmonary function
	Sports quality	Sports ability

Since each indicator has a different impact on physical fitness, a judgement matrix needs to be defined by quoting 1–9 and its reciprocal (as shown in Table 3).

Table 3. 1–9 and its reciprocal scale

Scale	Meaning
1	Both indicators are equally important
2	The former is slightly more important than the latter
3	The former is obviously more important than the latter
4	The former is more important than the latter
5	The latter is more important than the former
6/7/8/9	Two adjacent intermediate values
Reciprocal	$1/x_{ij}$

Note: x_{ij} is the relative importance of the two indicators.

The judgment matrix built from Table 4 is as follows:

$$(x_{ij})_{n \times n} = \begin{bmatrix} x_{11} & x_{12} & x_{13} & \dots & x_{1n} \\ x_{21} & x_{22} & x_{23} & \dots & x_{2n} \\ \dots & \dots & \dots & \dots & \dots \\ x_{n1} & x_{n2} & x_{n3} & \dots & x_{nn} \end{bmatrix} \tag{3}$$

In the formula, x_{ij} is the ratio of importance and n is the index. According to the contribution rate of each principal component (or principal factor) in the previous principal component analysis, this paper obtains the weights of the secondary indicators (each principal component) and the tertiary indicators (each representative indicator) through calculation. As a result, a system of physical fitness indicators and a weight table for male and female students in physical education institutions has been established, as shown in Tables 4 and 5:

Table 4. Physical fitness index system and weight table of male students in physical education institutions

Primary index	Weight	Secondary index	Tertiary indicators	Weight
Body shape	0.33	Body composition	Ketole index	0.38
		Body length	Height	0.32
		Proportion of body longitudinal structure	Lower limb length	0.18
		Proportion of body transverse structure	Finger spacing - height	0.15
Physical function	0.31	Motor function	Heart rate immediately after exercise	0.58
		Balance factor	Heli test	0.42
Sports quality	0.38	Special factor	Lift	0.29
		Flexibility	Comprehensive flexibility	0.23
		Trunk factor	Abdominal curl	0.21
		Speed force	Vertical jump	0.16
		Sensitive coordination factor	Lateral jump	0.13

Table 5. Index system and weight table of physical fitness of female students in physical education institutions

Primary index	Weight	Secondary index	Tertiary indicators	Weight
Body shape	0.33	Body composition	Ketole index	0.38
		Body length	Height	0.27
		Proportion of body longitudinal structure	Lower limb length	0.23
		Proportion of body transverse structure	Finger spacing - height	0.16
Physical function	0.31	Motor function	Heart rate immediately after exercise	0.56
		Balance factor	Heli test	0.46
Sports quality	0.38	Special factor	Lift	0.30
		Flexibility	Comprehensive flexibility	0.22
		Trunk factor	Abdominal curl	0.20
		Speed force	Vertical jump	0.16
		Sensitive coordination factor	Lateral jump	0.13

According to Tables 4 and 5, the thresholds (or interval values) on which the rating is based are referred to as standards in surveying. Designing evaluation criteria is an important task in establishing evaluation system. At present, the main evaluation criteria are scoring criteria and rating criteria (or rating criteria) [10]. For example, when we evaluate a person's physical stamina, we will say that the person's physical stamina is excellent, good, general, unqualified, poor and so on. Therefore, the criteria for evaluating the quality of physical education are set as follows.

$$M = \{m_1, m_2, m_3, m_4, m_5\} \quad (4)$$

In this set, M is the set of evaluation criteria; m_1 is excellent; m_2 is good; m_3 is general; m_4 is unqualified; m_5 is poor. But evaluation standard concentration's outstanding, good, general, unqualified, poor and so on. Here, the weights of each index calculated above can be used to determine the evaluation criteria determined as shown in Table 6.

Table 6. Criteria for Evaluation of Indicators

Index	Excellent	Good	Commonly	Unqualified	Difference
1	≥ 95	(86, 91)	(76, 85)	(61, 75)	≤ 60
2	≥ 85	(86, 91)	(72, 85)	(66, 75)	≤ 60
3	≥ 90	(80, 80)	(76, 80)	(71, 75)	≤ 60
...
n	≥ 90	(86, 91)	(76, 85)	(66, 85)	≤ 60

After the establishment of the impact assessment model, we can know the changes in physical stamina before and after the special endurance training.

The scoring standards refer to the index values or interval values corresponding to different grades of each index (such as 0, 5, 10, etc.); the rating standards refer to the index values or interval values corresponding to different grades of each index (such as upper, middle, middle, lower and lower). Scoring standards can be divided into individual scoring standards and comprehensive scoring standards, the same reason, rating standards can be divided into individual rating standards and comprehensive rating standards.

2.3 Realization of Physical Education Teaching Quality Evaluation Method

In order to achieve the goal of teaching quality evaluation, the equipment and structure of students' teaching quality evaluation are optimized. The system consists of a video capture terminal, a video server and a display monitoring terminal. With the development of miniaturization of sensor technology, it is possible for people to use micro cameras anytime, anywhere. The structure diagram of the collection equipment of the mobile teaching terminal of the mobile system for teaching quality evaluation is shown in Fig. 3.

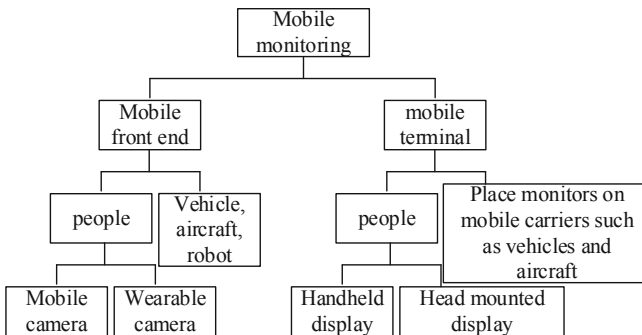


Fig. 3. Structure of mobile teaching terminal acquisition equipment for teaching quality evaluation of mobile system

As can be seen from Fig. 3, the portable intelligent mobile monitoring system with video transmission, storage, analysis and other computing functions can follow the patrol at any time and any place to “observe” the surroundings or specific targets, and assist the human to perform some visual functions when the human visual intelligence drops, so as to improve the reliability of the biological system in completing visual tasks. Intelligent mobile surveillance will become the development direction of manned mobile surveillance. In this paper, the wearable visual system is used to do this task. When a person is found to be in a passive state of attention, a comprehensive analysis is carried out, and when a suspicious/interesting object appears, an independent intelligent surveillance is carried out.

The results of capturing the physical status and monitoring information are shown in Table 7.

Table 7. Physical status and monitoring information capture results

Human mental state	Human attention state	Performance behavior	Main posture of head	Field of view characteristics	Capture/analysis strategy
Sober	Active attention	To glance	Move freely	Frequent scene transfer	No capture, no analysis
Sober	Active attention	Follow	Short pause	Similar scenes	Capture analysis
Dozing/distraction	Passive attention	Dull	Long pause	Scene too long fixed	Do not capture full analysis

From Table 7, we can see that the computation of scene similarity is similar to that of content-based image retrieval, matching the current frame with the key frame. If the similarity is high, the scene is considered as similar. Otherwise, the scene dissimilarity is considered as an abstract representation of an image, and an appropriate image feature can appropriately express the content of an image. At the same time, image feature is also the basis of image matching, which plays a key role in image retrieval. Image features can be divided into three levels.

The first layer is the visual features of the image, including color, texture and shape. These features can be obtained by extracting the pixel information of the image.

The second layer is the abstraction of the objects in the image. Human logic is added to the extraction of this feature.

The third level is semantic features of images, including scene semantics, emotion semantics and behavior semantics. Semantic features can express the rich content of an image.

Low-level features are easy to extract, but the description of image content is not comprehensive. The hierarchical features can fully express the image content, but it is difficult to extract. Because of the high requirement of real-time, the system calculates the similarity of the first level image, which is simple, robust and effective, and calculates the similarity of the collected image and the key frame. Based on the pause effect of

human attention behavior, there is less interframe motion caused by head movement. Head pause makes the background “stable” to a certain extent. When attention behavior occurs, moving objects in the scene will be detected. Therefore, it is feasible to confirm the state of concern by estimating the motion region between frames, which can also be summed up as a moving target detection problem. When a moving target can be detected, it shows that a person is in the attention behavior at this time, so as to achieve the goal of accurately monitoring students’ physical ability.

Thus, the final score of PE teaching quality evaluation is obtained.

3 Analysis of Experimental Results

Our country specialized sports team sports teaching quality appraisal way is many and varied, each province youth training method is not identical, therefore, the training way effect is also not same. Many coaches only evaluate the progress of students’ physical stamina through the grades of students. This evaluation method lacks certain scientific basis. Setting up the monitoring system of special teaching process for adolescent students is helpful to evaluate training effect and students’ status scientifically and provide reasonable basis for coaches. Ten adolescent students were selected in this study, none of them had a history of serious injury or illness. The basic information can be shown in Table 8.

Table 8. Basic Information of Students

Team member	Age	Height (m)	Weight (kg)	Training years (years)	Sport level
OCN	16	182.0	75.6	2	Second level
CINE	15	180.3	67.5	2	Second level
XIA	16	193.9	86.3	2	Second level
CYB	15	173.2	68.2	1	Second level
COAN	15	186.2	62.3	1	Second level
XON	16	179.5	73.5	2	Second level
XAG	14	170.3	59.9	2	Second level
QON	16	172.6	57.1	1	Second level
CAN	16	175.3	62.2	2	Second level
CGU	15	169.6	66.5	1	Second level

Human body in the movement of the speed, strength, sensitivity, flexibility and other basic state of the body and functional capacity, known as sports quality. Good sports quality is the basis of mastering sports skills and improving sports achievements, and the lack of good sports quality will affect the formation of perfect and difficult sports skills. According to the development and evaluation method of sports quality in Chinese Youth Training Syllabus, combined with some training forms and experts’ opinions, the items and indexes in this study are selected as shown in Table 9.

Table 9. Results of principal component analysis of sports quality index

Principal component	Contribution rate	Sports quality	Representative indicators	Other indicators
A	35.526%	Speed endurance	15 m 13 turn back run (4 groups)	Maximum vertical jump, standing long jump, triangle run, pull-up, breakthrough layup, etc
B	16.558%	Shoot	1.6 min self shooting	
C	10.356%	Sensitive	1 min double swing rope skipping, hexagonal jump	
D	8.658%	Speed	3/4 full court sprint	
E	6.985%	Power	Squats, push ups, sit ups	
F	1.608%	Pliable	Sitting body flexion	
Cumulative	79.691%	Kmo value = 0.553	—	

Traditional teaching quality evaluation standard of college students uses unified absolute evaluation standard and quantitative standard to measure different individuals with uneven physical and mental development level. The vocational teaching quality evaluation standard of colleges should combine the absolute standard with the relative standard. Let the students see the position of their own physical condition in their peers by absolute standard, make clear their own advantages and disadvantages, and find out the direction of exercise. Through comparative understanding, through exercise, their physical fitness is progress or decline, how much range, and then according to the evaluation of specific information to adjust the exercise program. However, it is very difficult to evaluate the attitude, emotion and the determination and modification of evaluation in the process of physical exercise. Only using quantitative evaluation standard can't reflect the situation of physical exercise, so that the evaluation of teaching quality deviates from the aim of education. Therefore, it is necessary to make a clear longitudinal comparison between the students themselves in the process of strengthening their professional physical strength by adopting the quantitative evaluation standard. The index scores (not weighted) shall be calculated according to the weighted scores of each single index of the special students. For example, if the score of the morphological index of a male student is $A = A11 + A21 + A31$, the weighted scores of all the single indicators (secondary indicators) included in the first indicator are summed up, as shown in Tables 10 and 11.

According to the different weights of the first class index, the weighted scores of the first class index of special students are calculated. The weighted scores of all the first-grade indexes are summed up to get the comprehensive physical fitness scores of special students. Calculation formula: Overall fitness score = A B + C. According to

Table 10. Teaching Process Monitoring Scores of Male Students

Full name	A11	A21	A31	A41	B11	B21	C11	C21	C31	C41	C51
	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score
1	7.05	1.56	2.75	1.06	8.35	4.2	3.1	2.65	3	0	0.66
2	3.15	3.52	1.68	1.46	1.78	0	0.8	3.16	1.7	1.8	1.18
3	0.79	4.66	2.89	0.79	0	1.65	3.9	1.92	2.5	0.76	1.68
4	0	2.18	1.52	2.22	8.86	3.65	2.5	2.36	2.7	0.54	2.7
5	1.58	0.95	1.31	1.96	5.32	5.85	3.5	1.76	0	2.5	0.27
6	5.86	2.85	0.97	2.7	8.86	2.06	1.9	2.28	3.3	2.2	1.18
7	4.69	1.89	0.65	0.38	1.78	6.15	1.9	2.23	3.5	5	0.79
8	5.86	0	0.49	2.32	10.32	6.65	0	2.95	5	1.5	1.83
9	3.52	0.95	2.58	1.68	3.65	4.36	0.7	2.85	5	1.06	2.65
10	2.65	2.79	2.11	1.05	2.95	5.85	3.8	3.65	0.6	1.3	1.52

Table 11. Monitoring Scores of Female Students in Teaching Process

Full name	A11	A21	A31	A41	B11	B21	C11	C21	C31	C41	C51
	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score
1	6.67	4.21	3.53	1.36	8.26	2.26	2.05	3.13	1.15	1.51	1.83
2	4.82	2.87	2.21	0.91	2.21	3.61	1.75	2.81	0.77	0	1.68
3	0.75	1.05	3.75	1.96	3.86	4.15	0.88	2.41	1.91	1.06	1.61
4	5.93	3.65	3.97	2.86	10.46	3.61	0.28	3.38	0.38	1.21	0.92
5	5.21	2.09	0.89	0.76	11.01	4.96	3.49	3.77	3.11	2.10	1.57
6	1.12	4.52	1.32	2.11	8.81	2.71	2.91	0.73	2.51	0.76	2.22
7	1.52	1.57	2.87	2.11	3.31	3.61	3.49	3.25	1.72	1.81	0.27
8	2.23	4.95	3.97	1.66	5.51	2.71	0.59	2.17	0.96	0.91	2.23
9	2.97	1.31	1.99	0.16	1.66	1.36	0	0	0.39	0.61	1.43
10	4.08	5.21	4.41	0.31	0	5.50	1.17	1.29	1.35	0.46	0.92

this formula, the comprehensive scores of special physical ability of the students can be calculated, and the development levels of special physical ability of male and female students can be ranked as shown in Tables 12 and 13.

Table 12. Body Shape Index Test Results

Test items	Height (CM)	Percentage of body fat (%)
First test	176.7 ± 6.9	0.23 ± 0.05
Second test	177.1 ± 7.3	0.18 ± 0.05**
Third test	177.1 ± 6.8	0.19 ± 0.04**
Fourth test	177.5 ± 6.8	0.18 ± 0.03**
Fifth test	177.8 ± 6.8	0.18 ± 0.02**
Sixth test	177. ± 6.2	0.18 ± 0.01**
F	0.078	5.493
P	0.997	0**

Table 13. Test Results of Physical Function Indexes

Test items	Creatine kinase (U/L)	Testosterone	Hemoglobin (g/L)
First test	131.78 ± 51.32	20.28 ± 13.65	132.25 ± 5.65
Second test	249.85 ± 142.659**	23.85 ± 13.65	128.65 ± 14.65
Third test	126.65 ± 57.85△△	22.62 ± 15.65	129.52 ± 5.85
Fourth test	132.85 ± 48.65△△	28.65 ± 12.82	125.65 ± 5.65
Fifth test	108.32 ± 48.65△△	42.52 ± 16.65**△ ^{oo}	128.65 ± 6.85
Sixth test	107.65 ± 36.01	44.15 ± 13.65**△△ ^{oo}	128.95 ± 6.32
F	7.88	9.12	1.05
P	0	0	0.50

There was no significant difference in body fat percentage ($p < 0.01$). The results of the second, third, fourth, fifth and sixth tests of body fat percentage were significantly lower than those of the first test ($p < 0.01$). However, the average percentage of body fat of the six tests did not decrease linearly, but showed a fluctuation curve. The results of comprehensive physical ability grade evaluation for male and female students are shown in Tables 14 and 15.

Through the above evaluation results, we can find different students in the sub-index and comprehensive physical differences, can clearly define each student in the whole group in the position and level. It is helpful for teachers to know and master the differences of students' physical ability, so as to provide a basis for scientific selection and selection of special students and for rational planning of teaching and training so as to realize the overall improvement of students' competitive ability. This is because this method combines the absolute standard and the relative standard, and constructs the quantitative evaluation index of College Physical Education Students' physique based on genetic algorithm, which lays the foundation for the clarity of evaluation; Optimize the management algorithm of physical fitness monitoring of college physical education

Table 14. Results of comprehensive physical fitness rating of male students

Evaluation grade	Inferior	Middle and lower class	Secondary	Medium and superior	Superior
Corresponding percentile	10%	10%–26%	26%–76%	76%–91%	91%
Scoring criteria	7.86	7.87–8.95	8.96–11.38	11.39–12.59	12.60
Special student	2, 3	5, 15	1, 5, 7, 8, 9, 11, 15, 18, 19	8, 12, 16	18, 21

Table 15. Results of Comprehensive Physical Fitness Rating of Female Students

Evaluation grade	Inferior	Middle and lower class	Secondary	Medium and superior	Superior
Corresponding percentile	10%	10%–26%	26%–76%	76%–91%	91%
Scoring criteria	7.62	7.63–8.09	8.10–11.87	11.88–12.59	12.60
Special student	9, 23, 29	2, 3, 11, 28	1, 4, 7, 8, 9, 11, 15, 17, 18, 1, 21, 23, 27, 90	13, 16, 26	6, 13, 27

students, and ultimately improve the accuracy of physical fitness monitoring of college physical education students by simplifying the monitoring process.

4 Conclusion

The physical education in colleges has the dual attributes of higher physical education and vocational physical education. It is not only necessary to fulfill the task of improving students' physique, but also to fulfill the task of enriching and perfecting the knowledge of physical education, the reserve of vocational physical ability and the reserve of sports skills that are beneficial to vocational activities, and to strengthen and develop the physical ability and related abilities that are important to vocational activities. The evaluation system of vocational teaching quality should not only evaluate the general physical ability related to health, but also the occupational physical ability closely related to occupation. In the actual PE teaching and teaching quality evaluation, we should highlight the students' professional characteristics, and guide the students to exercise their physical strength through the evaluation results. In this paper, a mobile monitoring method based on genetic algorithm is proposed for college physical education students. Innovatively based on genetic algorithm, the evaluation index of physical fitness of college physical education students is constructed; Optimize the management algorithm of physical fitness monitoring of college physical education students, and design mobile physical fitness monitoring equipment; By simplifying the monitoring process, the monitoring accuracy of physical fitness of college students is improved.

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