



Research on the Current Situation and Development Countermeasures of Physical Exercise for Postgraduates in Chinese Colleges and Universities

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Abstract: This paper aims to explore the countermeasures of improving the quality and effect of physical exercise for graduate students in Chinese colleges and universities. According to the questionnaire survey results of 1080 graduate students from 6 universities, this paper analyzes the interest and willingness of postgraduates in physical exercise, the frequency, duration and intensity of physical exercise, and the status of physical exercise items. The results show that there is a lack of awareness of the importance of physical exercise in postgraduate physical exercise, which affects their willingness to participate in physical exercise. Meanwhile, the effects of physical exercise do not reach the expected goal due to low frequency, short duration, and low intensity of physical exercise for graduate students. In addition, the traditional and single form of physical exercise programs, lack of emphasis on equipment training and confrontational training, and lack of sports venues, facilities, and professional guidance are reasons for the unsatisfactory physical exercise of postgraduate students. putting forward a series of countermeasures such as credit system and tutorial system, applying and promoting sports Apps, increasing network media publicity, standardizing sports community organization, optimizing and updating sports venues, facilities and management mode, so as make efforts to improve graduate students' enthusiasm in physical exercise, promote the cultivation of graduate students' physical exercise behavior and habits, and effectively to ensure the harmonious development of graduate students' physical and mental health.

Keywords: Physical Exercise, Postgraduate Students/Postgraduates, Current Situation, Countermeasures

1. Introduction

As early as 2007 the committee of American graduate schools issued *Postgraduate Education: The Pillar of American Competitiveness and Innovation*, it pointed out that postgraduate education is not only the source of future science and engineering leaders, but also the indispensable cornerstone of national strength and prosperity, and the pillar of American competitiveness and innovation [1-3]. As high-level innovative talents, postgraduates play an important role in high-end leading and strategic support in economic development and social construction. In order to cope with the increasing international competition, graduate students should not only have excellent professional skills,

but also have a full mental state and a healthy physique [4, 5]. However, in 2020, China Youth News Agency and other units jointly issued *the Health Survey of Chinese College Students in 2020*, which pointed out that 86 percent of college students suffered from sleep deprivation and emotional instability in the past year [6]. In addition, the level of physical fitness indicators of college students such as the proportion of vital capacity and BMI standard are in a declining trend year by year [7]. Health problems have become the main obstacle to the efficient study and work of postgraduates, which seriously reduce the study effect and quality of life of postgraduates [8].

Physical exercise is an effective measure to promote the physical and mental health development of postgraduates.

The participation of postgraduates in physical exercise is helpful to enhance cardiopulmonary function, prevent diseases and cultivate fitness posture [9]; it helps to regulate the tense learning mood and improve the physical and psychological state; it helps to eliminate fatigue, improve learning and work energy, and enhance work efficiency [10]; it helps to edify sentiment, maintain a healthy mindset, give full play to individual enthusiasm, creativity and initiative, improve self-confidence and values [11]; it helps to cultivate the team spirit, teamwork, collectivism and patriotism in the competitive competitions [12]. However, the World Health Organization (WHO) issued *the Guidelines on Physical Activity and Sedentary Behaviour* (hereinafter referred to as the Guidelines) in November 2020 [13], which pointed out that one quarter of adults and four fifths of adolescents do not take effective physical exercise at present. According to relevant reports in China, more than 70 percent of college students in China take part in physical exercise occasionally or not [14-16]. The above analysis shows that how to promote postgraduate students to participate in physical exercise and enhance their physical quality has become an urgent problem to be solved [17-19].

2. Research Objects and Methods

2.1. Research Objects

This study took 1080 postgraduate students from 6 colleges and universities in China as the research objects. On the basis of taking gender, discipline, educational background and grade into account as much as possible, each school randomly selects 10 male and female students from Grade 1 to Grade 3 for postgraduate students in arts, science and engineering, and 5 male and female students from Grade 1 to Grade 3 for doctoral graduates in arts, science and engineering with a total of 180 students, and a total of 1080 students are from 6 schools. The sampling method in the above sample can guarantee a wide coverage of this study and can effectively represent the current situation of graduate physical exercise.

2.2. Research Methods

Questionnaire Survey Method: According to the characteristics, basic principles, the selection and application of methods of physical exercise, the principles and methods

of physical exercise education 1 combined with the purpose of this study and the revised opinions of experts, we have designed the *Questionnaire of Basic Situation of Graduate Physical exercise* and conduct a questionnaire survey on 1080 postgraduate students. Among them, there are 720 postgraduate students and 360 doctoral graduates. A total of 1034 valid questionnaires were collected with the effective rate of 95.7%. The contents of the questionnaire mainly include: gender, discipline, educational background and other basic information; cognition of importance, function and enthusiasm of physical exercise; frequency, duration, intensity and other physical exercise loads; physical exercise programs, etc.

Literature Review Method: In order to lay a good foundation for the smooth progress of the research, we extensively search, consult and focus on the reference of the research results of the factors affecting and methods of physical exercise and other aspects according to the needs of the investigation. Combined with the design of this paper, it is helpful to the teaching and management methods of postgraduate physical exercise in colleges and universities.

3. Results and Analysis

3.1. Importance and Function of Physical Exercise

The cognition determines behaviors. The angle, height and depth of a person toward problems determine the development and direction of behavior. Whether postgraduate students can participate in physical exercise first depends on their cognition of physical exercise.

Table 1. Graduate Students' Awareness towards the Importance of Physical Exercise.

| Name | Very Important | Important | Unimportant | Indifferent |
|-----------|----------------|-----------|-------------|-------------|
| Number | 128 | 786 | 46 | 74 |
| Radio (%) | 12.4% | 76% | 4.4% | 7.2% |

Table 1 shows the survey statistics of postgraduates' awareness towards the importance of physical exercise. The data showed that 786 people think physical exercise is important; 128 people think it is very important; 74 people think it is indifferent to physical exercise; and only 46 people think it is unimportant accounting for 4.4%. It can be known from the data that nearly 90% of postgraduate students think physical exercise is of great importance.

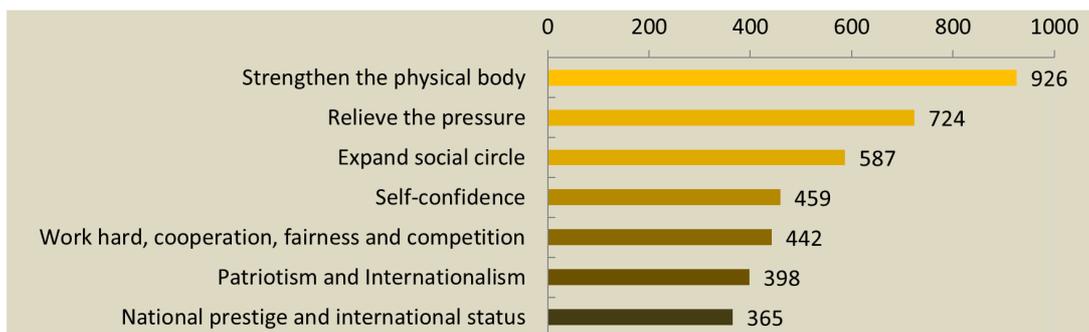


Figure 1. Cognition of Postgraduate Students' Physical Exercise Function.

Figure 1 is the survey statistics of the cognition of graduate students' physical exercise function. 89.6% of the postgraduate students think that physical exercise can strengthen the body; the postgraduate students think that physical exercise can relieve the pressure accounting for 70%; some postgraduate students think it is necessary to expand social circle accounting for 56.8%; 44.4% of the postgraduate students think that it can improve self-confidence; the postgraduate students who think that it can enhance the spirit of hard work, cooperation and fair competition account for 42.7%; 38.5% of the postgraduate students think that it can enhance the spirit of patriotism and internationalism; 35.5% of the postgraduate students think it can enhance national prestige and international status.

The above survey results on the importance and functional cognition of physical exercise for postgraduate students show that: (1) College postgraduate students generally hold a positive attitude towards physical exercise; (2) postgraduate students' understanding of physical exercise function is not comprehensive enough with limitations. Most of them stay at the level of personal needs such as physical fitness, stress relief, expanding social circle, improving self-confidence and other aspects; and there is less understanding of the social needs of physical exercise such as strengthening the spirit of hard work, cooperation and fair competition, patriotism and internationalism, enhancing national prestige and international status and other aspects.

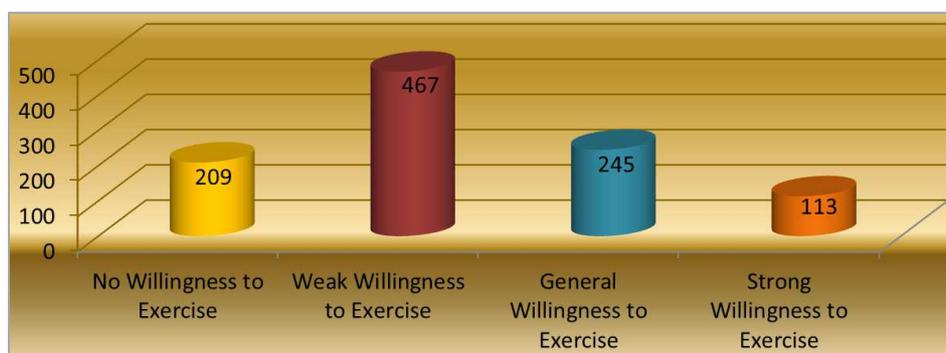


Figure 2. Survey of Physical Exercise Willingness of Postgraduate Students.

The results of the above survey on the enthusiasm and willingness of postgraduate students in physical exercise show that: (1) the overall enthusiasm of postgraduate students in physical exercise is not high and 67.4% of postgraduate students' enthusiasm degree is lower than average; (2) the overall willingness of postgraduate students to participate in physical exercise is low and 65.4% of postgraduate students have no or basically no idea to participate in physical exercise; (3) there is a strong positive correlation between postgraduate students' enthusiasm in physical exercise and their exercise behavior. The enthusiasm in physical exercise is low, so the willingness to participate in physical exercise is weak; the enthusiasm in physical exercise is higher and the willingness to participate in physical exercise is also stronger. Therefore, to promote the graduate students to participate in physical

Table 2. Survey of Graduate Students' Enthusiasm in Physical Exercise.

| Name | No Enthusiasm | Low Enthusiasm | General Enthusiasm | High Enthusiasm |
|-----------|---------------|----------------|--------------------|-----------------|
| Number | 276 | 421 | 224 | 113 |
| Radio (%) | 26.7% | 40.7% | 21.7% | 10.9% |

3.2. Enthusiasms and Willingness of Physical Exercise

Enthusiasms are a kind of inner power that impels people to seek knowledge. Postgraduate students' enthusiasm in physical exercise can promote their continuous focuses on physical exercise and participation in physical exercise. Table 2 is the survey statistical results of graduate students' enthusiasm in physical exercise. Among them, 276 students showed no enthusiasm in physical exercise, 421 students are with lower enthusiasm, 224 students have general enthusiasms, and only 113 were very enthused in physical exercise. They accounted for 26.7%, 40.7%, 21.7% and 10.9%, respectively.

The willingness of graduate students' physical exercise is their subjective thinking whether to participate in physical exercise or not through their cognition and view of physical exercise. Figure 2 is the survey statistics of graduate students' willingness to participate in physical exercise. Only 113 students have strong willingness to exercise; 245 students have general willingness; 467 students have weak willingness and 209 students are unwillingness to participate in physical exercise; they account for 10.9%, 23.7%, 20.2% and 45.2% respectively.

exercise is necessary to strengthen their willingness to participate in physical exercise and improve their enthusiasm in physical exercise.

Table 3. Statistical Table on Frequency of Postgraduate Students' Physical Exercise.

| Name | 0 Time | 1~2 times | 3 times or above |
|-----------|--------|-----------|------------------|
| Number | 324 | 498 | 212 |
| Radio (%) | 31.3% | 48.2% | 20.5% |

3.3. Frequency, Duration, and Intensity of Physical Exercise

The frequency of physical exercise is the number of times postgraduate students participate in physical exercise in a week. The results of the survey are shown in Table 3. 287 students did not participate in physical exercise; 498 students

do physical exercise once or twice and only 212 students participated in physical exercise three times or above in a week. It can be concluded from the data that most postgraduate students participate in physical exercise less than 2 times per week. According to the requirements of "no less than three extracurricular physical exercise per week", which is in the *Basic Standards for Physical Education Work in Colleges and Universities* issued by the Ministry of Education of China in 2014, there are 79.5% of postgraduate students have no enough exercise number of times in a week.

The duration of physical exercise is the total time of postgraduate students' daily physical exercise and the results of the survey are shown in Table 4. 524 postgraduate students do physical exercise within 30 minutes; 314 postgraduate students do physical exercise for 31~60 minutes; only 196 people exercised for more than 60 minutes a day. It can be concluded from the data that the main duration for postgraduate students to participate in physical exercise in the day is within 30 minutes. According to the requirements of "ensuring that teenagers conduct physical exercise for one hour a day" in the *Opinions of Deepening the Integration of Physical Education and Promoting the Healthy Development of Adolescents* issued by the Ministry of Education, daily exercise duration is not enough for more than 80% of postgraduate students.

Table 4. Statistical Table of Graduate Students Physical Exercise Duration.

| Name | 0~30 Minutes | 31~60 Minutes | ≥ 60 Minutes |
|-----------|--------------|---------------|--------------|
| Number | 524 | 314 | 196 |
| Radio (%) | 50.7% | 30.4% | 18.9% |

The intensity of physical exercise is the amount of force and the intensity of the body during exercise, which directly affects the effect of physical exercise. Appropriate intensity of physical exercise can effectively improve the body function, enhance the physique and achieve the effect of

physical fitness. This paper divides the intensity of physical exercise into three types: the first is the lower intensity, which basically do not feel tired after exercise such as walking, broadcast gymnastics, Tai Chi and so on; the second is the general intensity with the increasing heart rate after exercise and slightly tired feeling such as running, climbing, swimming, yoga and so on; the third is the higher intensity with short breathing after exercise and the tired feeling such as badminton, aerobics, rope skipping, cycling and so on. Table 5 is the statistical results of the survey on the physical exercise intensity of graduate students. Among them, 254 students had exercise with the higher intensity; 411 students had the general exercise and 369 students exercised at the lower intensity. According to the requirements of "engaging in high-intensity aerobic exercise at least three days a week and enhancing the training of muscle and bone health" in the *WHO Guide*, 75.4% of postgraduate students did not meet the standard of the intensity of exercise.

Table 5. Statistical Table of Physical Exercise Intensity of Postgraduate Students.

| Name | Lower | General | Higher |
|-----------|-------|---------|--------|
| Number | 369 | 411 | 254 |
| Radio (%) | 35.7% | 39.7% | 24.6% |

The results of the above survey on postgraduates' physical exercise load show that: the overall physical exercise of Chinese postgraduate students are in the current situation of low exercise frequency, short exercise duration and small exercise intensity. This condition can not promote the physical health, mental health, social health and the overall health of postgraduate students. Therefore, the corresponding measures must be taken to standardize and promote postgraduate students' physical exercise.



Figure 3. Statistical Diagram of Daily Physical Exercise Project of Postgraduate Students.

3.4. Physical Exercise Programs

In order to have a clearer understanding of the sources of the physical exercise load of postgraduate students, this paper further investigates the selection factors of physical exercise programs of postgraduate students. As shown in Figure 3, the more choices of daily physical exercise for postgraduate students are walking and running, followed by basketball, badminton, aerobics, broadcast gymnastics, rope skipping, etc., and other physical exercises projects are more scattered.

The above survey results of the graduate students' physical exercise program show that: the physical exercise programs that graduate students participate in are those below the moderate intensity accounting for 75.4%. They like and actively participate in the more traditional and single sports with the characteristics of light equipment and weak confrontation. These exercise projects also have fewer requirements for venues, facilities and professional guidance.

4. Countermeasures

Combined with the above survey results, it can be concluded that there are the following problems in physical exercise of postgraduate students at present: (1) lack of recognition and have limitations of physical exercise; (2) their not high enthusiasm in physical exercise affects their willingness to participate in physical exercise; (3) the frequency, duration and intensity of physical exercise are low and the overall load fails to meet the standard; (4) physical exercise program is relatively traditional and single with light equipment, weak confrontation, and fewer requirements for venues, facilities and professional guidance.

For the above problems, this paper proposes countermeasures from four aspects to promote and improve the physical exercise behaviors of postgraduate students. First, expand 5G networks and new media communication to broaden postgraduate students' understanding of physical exercise, make them more extensive and in-depth understanding of feeling physical exercise and improve sense of physical exercise identity; The second is to standardize sports associations and organizations, implement the physical exercise tutorial system, enhance the enthusiasm and confidence of graduate students in physical exercise and stimulate their initiative to participate in physical exercise; Third, we can use the credit system and physical exercise APPs to guide postgraduate students' physical exercise behaviors and make them reach the physical exercise load. The fourth is to provide advanced, convenient and safe sports venues, facilities and management, enrich postgraduate physical exercise programs and improve the quality of physical exercise.

4.1. Increase the Network and New Media Communication

With the transformation of modern lifestyle, the influence power of the network and media to college postgraduate students shall not be underestimated. The communication

technology and mode are more novel with the more stronger interactivity. Expanding 5G network and new media communication is a method aimed at improving the breadth and depth of sports knowledge and skills of postgraduate students. On the one hand, the rapid communication of sports events, skills, competitions and health knowledge that postgraduate students are concerned about through multi-scene in-depth experience of 5G network enhancing the immersive experience of sports such as the senses of presence, interaction, etc, which makes the complicated and difficult to close and accept sports become simple, make the original seemingly tedious sports rules become clear and easy to understand; make the original empty sports spirit become real and challenging, and create an all-round and immersive physical exercise atmosphere for graduate students. On the other hand, we should make full use of the characteristics of the immediacy and interactivity of new media elements such as digitalization, Internet and publishing platform to strengthen the communication of cultural connotations of sports such as humanistic spirit and competitive spirit, to let postgraduate students' understanding of physical exercise rise to the social demand and spiritual pursuit of sports value, and effectively enhance the graduate students' cognition and recognition of physical exercise.

4.2. Standardize the Sports Associations and Organizations

Standardizing college sports associations and organizations aims to apply the characteristics of interactivity, openness, diversity and flexibility of the associations to enhance graduate students' enthusiasm in physical exercise. Sports associations or clubs are the second class of physical education in colleges and universities, and also an important carrier to achieve physical exercise with a great influence among college students. At present, there are many kinds of sports associations and organizations in colleges and universities, but there are generally the shortcomings of the non-standard management and the uneven business level, which can not meet the requirements of postgraduate students to expand social circles, enrich life, please the spirits, improve sports abilities, enhance physical qualities and so on. In order to attract and retain more postgraduate students to participate in sports associations and organizations, the operation and management of sports associations and organizations shall be standardized. First, it can increase the allocation of professional physical education teachers to provide more scientific physical exercise guidance for postgraduate students. Colleges and universities shall introduce incentive policies for guiding teachers to encourage them in the assessment and reward; the second is to strengthen the organization and financial management of the associations, establish and improve the evaluation mechanism and incentive mechanism for the associations, and provide a more open, transparent and harmonious sports atmosphere for postgraduate students; the third is to enrich the contents and forms of associations activities, carry out more competitive activities to increase opportunities for postgraduate students to collaborate and

exchange, improve the sense of teamwork and competition and achieve a higher sense of satisfaction and accomplishment.

4.3. Implement the Physical Exercise Tutorial System

The tutorial system of physical exercise aims to help postgraduate students choose suitable physical exercise programs and difficulties, enhance their self-confidence in physical exercise and achieve the expected exercise effects. The tutorial system of physical exercise divides postgraduate students into different groups according to their own enthusiasms or sports expertise and the corresponding professional physical education teachers serve as the tutors of the extracurricular physical exercise project and promptly answers and proposes solutions to the problems of postgraduate students' physical exercise after class. They can ensure that postgraduate students receive more comprehensive, professional and humanized sports guidance strengthening their physical bodies. Tutors need to give postgraduate students professional guidance in terms of the selection, difficulty, intensity, frequency and duration of physical exercise items, help formulate suitable exercise programs and stimulate self-confidence, self-monitoring and self-regulation in sports. The stronger self-confidence to participate in physical exercise, the more courage to take the initiative to overcome difficulties. The more opportunities for success, the stronger the willingness to participate in physical exercise. On the contrary, there is the lower the willingness to participate in physical exercise.

4.4. Implement the Credit System for Physical Exercise

The credit system of physical exercise aims to apply the requirements of credits to regulate postgraduate students' participation in physical exercise. Different from undergraduates, postgraduate education generally does not require credits for physical education courses, but it is precisely this reason why many graduate students despise and relax physical exercises. The credit system of physical exercise allows postgraduate students to independently select specialty sports courses, physical exercise knowledge lectures, physical exercise exchange seminars, sports competitions and other sports-related activities, and urges graduate students to obtain prescribed credits in the form of check-in, so that postgraduate students who do not like or are unwilling to participate in physical exercise imperceptibly experience the changes in their lives that physical exercise brings to them and then actively participate in physical exercise. On the one hand, the credit system of physical exercise shall fully integrate the school's hardware facilities, physical education teachers' expertise and the needs of postgraduate students; on the other hand, it can apply the WeChat group, QQ group and other interactive platforms that postgraduate students love to strengthen the interaction between teachers and students, and among students. We can also exchange, share the experience of exercise and learning resources, and create a physical exercise atmosphere of

mutual learning, helps and encouragement.

4.5. Promote the Applications of Physical Exercise Apps

With the rapid development of modern communication technology, various Apps have made our lives more convenient. Colleges and universities can customize physical exercise apps according to the physical training needs of postgraduate students and their own software and hardware conditions, fully integrate modern technology, physical knowledge and skills with postgraduate physical exercises, improve the scientificity, regularity and self-consciousness of postgraduate physical exercises, supervise and guide postgraduate students' physical exercise behaviors. Physical exercise Apps can not only trigger the habitual behavior of postgraduate students' physical exercise, but also trigger their thirst for upcoming sports rewards. Through active social interactions such as group postings, likes, rankings and sharing, especially the intuitive presentation of sports data, postgraduate students' sense of control and autonomy in participating in physical exercise can be enhanced, and the formation of physical exercise habits is accelerating. In addition, postgraduate students can also use the physical exercise Apps to meet partners with the same thoughts and needs in the school, establish close relationships through exchanges and interactions, enhance the sense of belonging and form a community of physical exercise. Finally, it would realize the perfect transformation from the mechanical and passive clock-in required by the initial credit system to the participation in physical exercise actively and even eagerly.

4.6. Optimize Sports Venues, Facilities and Management

Sports venues and facilities in colleges and universities are necessary material conditions and important carriers for postgraduate physical exercise. Without a certain number and quality of sports venues, physical exercise cannot be developed effectively in the long term. The optimization of sports venues, facilities and management aims to provide postgraduate students with convenient, safe and innovative physical exercise software and hardware conditions, to ensure that postgraduate students can continue to complete their exercise projects, and to attract postgraduate students to try more innovative physical exercise projects to increase their participation in sports enthusiasm and satisfaction. On the one hand, there shall increase financial support for sports, open sports venues and equipment to postgraduate students for free or at a relatively low cost, with a relatively wide time and scope of use; on the other hand, it can maintain the stadiums in a timely manner, update sports facilities and equipment, and teach postgraduate students innovative sports and skills. In addition, colleges and universities should also make full use of the advantages of physical education teachers, equip sports venues and facilities with professionals responsible for safety and guidance, and provide graduate students with scientific, characteristic and functional stadiums and facilities as much as possible.

5. Conclusion

Postgraduate students shoulder the hope of the nation and the future of our motherland, who are the successors of the nation and the spokespersons of the country's image. As an important period for the healthy growth of postgraduate students and the formation of ideological and moral concepts, college and university education must always adhere to the educational philosophy of "health first".

In this paper, the following specific measures are proposed to improve the effect of physical exercise based on the analysis and investigation of the status quo of postgraduate physical exercise. Firstly, 5G network and new media communication is adopt to expand graduate students' awareness of physical exercise, and improve graduate students' sense of identity with physical exercise. Secondly, the organization of sports clubs are standardized and a physical exercise tutorial system is used to enhance graduate students' interest and self-confidence in physical exercise, which stimulate graduate students' initiative to participate in physical exercise. Thirdly, the credit system and physical exercise APP is applied in postgraduate students' physical exercise behavior to ensure the physical exercise load. Fourthly, University administration should modify sports venues, which are advanced, convenient and safe for postgraduate physical exercise, facilities and management. These venues can enrich postgraduate physical exercise programs, and improve the quality of physical exercise. The above-mentioned four methods will surely implement physical training throughout the entire process of graduate education, strengthen their system, temper their will, improve their personality, and promote their overall physical and mental development.

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