

Construction of University Students Sports Health Management Service Platform Based on the Integration of Physical Medicine with Artificial Intelligence

Weizhen Gao¹, Xiaoli Hu^{2*}

Abstract

To reduce the health risk of college students and exploit a new path of health promotion, a health management system for college students was constructed, and it includes health education, information collection and filing, health testing, risk assessment, and exercise intervention plan. The results indicate that the health management system for college students can provide scientific circulation and sustainable health intervention plans for college students, carry out health warning, reduce health risks, exploit a new path for college students' health promotion, and meet the requirements of colleges and universities for students' physical health management.

Keywords: Combination of sports and medicine, College students, Health management, System construction

1. Introduction

With the comprehensive advancement of information process in China, the information process in various fields is developing rapidly, and more and more Internet application platforms are applied in our campus life. These applications not only improve the quality of our campus life but also greatly help our healthy learning. Based on this idea, the college students' physical health management platform provides convenient management for students and teachers, reduces schools' operating costs, and simplify the process. At the same time, the use of college students' physical health management platform can enable teachers to analyze the data of students, understand the healthy condition of students, and facilitate the specific supervision of students. The current situation shows that college students do not love physical exercise. Therefore, the development of this management system can objectively monitor the students' physical exercise time and encourage students to gradually love physical exercise, so that they can realize the importance of health. Besides, the platform is widely

used and easy to use.

Promoting college students' health is a continuous improvement, gradual progress, and sustainable development process. If the resultant role of college sports resources and medical resources can be given full play to, it can not only continuously provide college students with health promotion but also cultivate them to form a self-health promotion behavior mode, so it is an effective way to fundamentally improve the physical health of college students and even benefit their whole life health. Based on this, this study constructed and studied the college students' health management system, aiming to construct a mode of "combining physical exercise with medical service in colleges" that is suitable for college students and can develop sustainably, and then the strategies are provided for promotion, thus strengthening the health management of college students group, promoting the healthy development of college students, and forming their health behavior mode, and then exploiting a new path for college students' health promotion.

2. Demand analysis

The demand analysis system is open to three roles, including students, teachers, and the school administrator, and each role has a different use case.

1. Physical Fitness Surveillance Center, China Institute of Sport Science, Beijing, 100061, China

2. School of Economics and Management, Tongji University, Shanghai, 200092, China

*Correspondence author: Xiaoli Hu . Email: hi.xiaoli@hotmail.com

Among them, students have the rights to log in the system, modify information, upload data, exit the system and so on; Teachers have the rights to log in the system, manage students, modify teacher information, modify student information, modify student data, print data, exit the system and so on. Among them, the use case of managing students includes adding and deleting students, the use case of modifying student data includes uploading and

modifying grades, and the use case of printing data includes printing list and grades. The school administrator has the rights to log in the system, log out of the system, modify information, manage students, manage teachers and so on. Among them, the use case of managing students includes adding students and deleting students, while the use case of managing teachers includes adding and deleting teachers [3], as shown in Fig. 1.

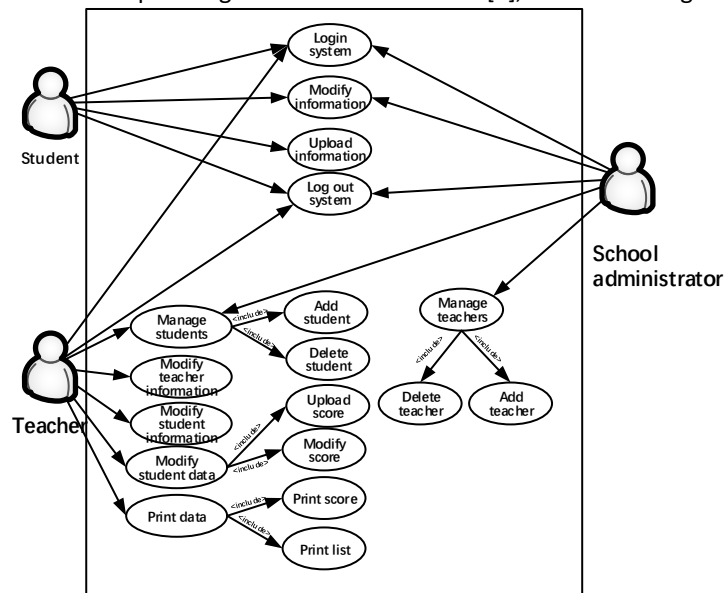


Fig. 1 Use case of college students' physical health management platform

3. Foundation of college student health management system construction

3.1 Theoretical basis for college student health management system construction

As the theoretical basis for the college student health management system construction, the combination of physical education and medical science has an important connotation and significance under the background of "healthy China". The combination of physical education and medical science can be simply understood as the combination of sports and medical science, that is, the intersection and fusion of sports science and medical science. The term "combination of physical education and medical science" first appeared Wang Shengbao's Discussion on the Combination of Physical Education and Medical Science in 1998, while the concept of combination of physical education and medical science was clearly defined in 2011. In The Construction of Innovative Mode of Sports Public Service of 'the Combination of Physical Education and

Medical Science' in Urban Communities, scholars Zhao Xianli et. al thought that the combination of physical education and medical science referred to the collection of knowledge of sports medicine, health care sports, rehabilitation medicine, medical nutrition, health assessment, sports prescription and so on. Sports and medicine are closely combined to supplement, permeate and promote each other. This concept focuses more on the combination of sports and medical knowledge. In the subsequent studies, it gradually involves the combination of sports and medical teaching, sports and medical service, sports and medical industry, and sports and medical benefit. Its essence is the all-around combination of sports and medicine in society and the population. In the field of health promotion, the combination of sports and medical science focuses on the means and methods provided by physical education as well as the ideas and paths provided by medical science, and it jointly promotes the development of people's health through exercise prescription and other ways, such as conducting a health status survey or establi-

shing a health management system to promote the health of people from different occupations.

The Outline of "Healthy China 2030" clearly proposed to improve people's physical quality through "launching an extensive exercise campaign for the general public, strengthening the integration of physical education and medical science and non-medical health interventions, and promoting the physical activities of key groups". In this context, this study aims at the population of college students to build a health management system for college students based on the "combination of physical education and medical science in colleges". In this study, the "combination of physical education and medical science in colleges" is defined as a comprehensive assessment of the health status and physical quality of college students within the scope of colleges and universities based on the physical evaluation of the medical examination and physical testing center (or the public physical education department) of the university hospital (or the physical examination center of the hospital). Besides, it is also about the theories, processes, methods, and modes carrying out health intervention of college students by formulating scientific, personalized exercise prescription or provides other exercise means based on relevant indicators.

3.2 Practical basis for college student health management system construction

In this study, field investigation method and interview method were used to randomly select 20 colleges and universities from Hebei, Henan, Guangdong, Jilin, and Shaanxi provinces during the period from February 2019 to December 2019, and it was found that all colleges and universities were equipped with campus hospitals (or school health rooms, school clinics), public physical education teaching department (or physical fitness testing centers), medical personnel, physical education teachers or sports science health care/rehabilitation teachers, and sports activities such as staff sports meeting or staff ball games, as well as the annual physical examination of university staff. Therefore, they have already met the conditions of "combination of physical education and medical science in colleges", thus laying a solid practical foundation for the college student health management system construction.

3.3 Construction of college students' health management system ---the mode of "combination of physical education and medical science in colleges"

3.3.1 Construction and form of the mode of "combination of physical education and medical science in colleges"

The mode of the "combination of physical education and medical science in colleges" constructed in this study is completed by the mutual cooperation of physical education in colleges and personnel and elements related to medical science, and it is "a closed loop of health promotion process" for college students: including seven steps. The first step is health knowledge education; the second step is health information acquisition and health records; the third step is health detection; the fourth step is a comprehensive evaluation of health risks and physical quality; the fifth step is the formulation of exercise prescription or exercise intervention scheme; the sixth step is the implement and monitoring of exercise prescription or exercise intervention scheme; the seventh step is the feedback and fine adjustment of exercise prescription or exercise intervention scheme. After one cycle of intervention, it was cycled from the seventh step to the second step, and the intervention effect was further tested through physical examination to guide the improvement of the exercise prescription or intervention scheme in the next cycle.

3.3.2 Service contents of the mode of the "combination of physical education and medical science in colleges and universities"

The first step is health knowledge education, and the main contents include disease prevention, health care, scientific exercise, reasonable diet, smoking cessation and alcohol restriction, psychological balance, etc. This link is mainly based on the behavior of "knowledge, faithfulness-practice". While popularizing health knowledge, it enables college students to accept health management and the mode of "combining physical education and medical science in colleges and universities" cognitively, so as to lay a certain belief foundation and theoretical knowledge foundation for the implementation of the mode of "combining physical education and medical science in colleges and universities".

The second step is to collect health information and establish health records. The main contents include personal general information (gender, age, etc.), family history of disease, lifestyle (diet, exercise, drinking, smoking, sleep, etc.), exercise history, etc.; After college students fill in the Health Information Collection Form in person, the files will be archived electronically, an electronic file will be established, and a database will be built, thus providing a basis for

implementing the sustainable improvement of the mode of “the combination of physical education and medical science in colleges and universities” in the future.

The third step is health detection. Physical examination is not only the most important step to understand the health status but also an important basis for the formulation of exercise intervention schemes in the future. The specific contents of the physical examination include height, weight, blood pressure, and blood, and urine laboratory tests (blood lipids, blood sugar, etc.). Only when the health condition is understood can targeted intervention and improvement be carried out. The “physical examination report” and “interpretation of physical examination report” should also be stored in electronic files for reference and reserve.

The fourth step is a comprehensive assessment of health risks and physical fitness. Health risk assessment is a key technical component of the health management process, and it mainly refers to the forecasting and quantification of physical condition and risks of illness conducted according to the college students’ collected personal health information as well as the health risk assessment model. Then according to the national general physical quality rating scale, the college students’ individual physical quality is evaluated, in order to help them evade the risk factors in daily life. Besides, it also points out the direction for the next step of the intervention focus and lays a foundation for the formulation of the plan.

The fifth step is to formulate an exercise prescription or exercise intervention scheme. Based on necessary GXT of college students, an exercise prescription or exercise intervention plan was formulated, including moving targets, exercise, exercise intensity, exercise, exercise frequency and time considerations, then relevant suggestions on diet, work and rest were attached, and then the use of intervention program cycle, and the desired effect were illustrated.

The sixth step is the implementation and monitoring of exercise prescription or exercise intervention scheme. In the process of implementing intervention programs for college students, dynamic tracking effect evaluation can be realized through personal health management log, participating in special maintenance courses, and cooperating with teachers to follow up. In addition, the Internet

platform and APP software can be used for self-management and interaction with the instructor.

The seventh step is feedback and fine-tuning of exercise prescription or exercise intervention scheme. The exercise intervention in this mode is a long-term, continuous, continuously improved process, and we must make college students internalize into a part of their own behavior from passive to active, so that the mode can be persisted for a long time and its intervention effect can be achieved. The exercise intervention scheme was divided into continuous stages, including 3 months, 6 months, and 12 months, and according to the intervention effect of college students, the scheme was slightly adjusted, and the concrete implementation process could use the behavior intervention strategy of “early constraint-medium-term incentive - later maintenance”, in order to change the individual behavior mode of college students’ exercise prescription routinization.

4. Implementation path of school physical education health management service

As can be seen from the figure 2, under the unified leadership of the school leaders, the physical education and health management service is a health management system with the main contents of physical education and health testing, physical education classroom teaching, extracurricular sports activities, sports training and competitions carried out by the physical education teaching and research section with intelligent equipment or instruments. The specific tasks include health information collection - students’ physical education and health management files - students’ physical education and health management information analysis and evaluation - personalized physical education and health guidance, intervention - re-collection - re-evaluation - re-guidance, intervention... First of all, intelligent software or network is used to collect and manage students’ health information, and establish students’ electronic health management account and file. The school carries out health education related to physical health nutrition knowledge, exercise and fitness knowledge, and sports safety knowledge in a variety of ways, such as elective courses, networks, lectures, and reports. Then the students’ health status is evaluated, and the fitness and health management program in the physical education class, extracurricular sports activities, sports training and competition is formulated, and the students’ health status is intervened and guided.

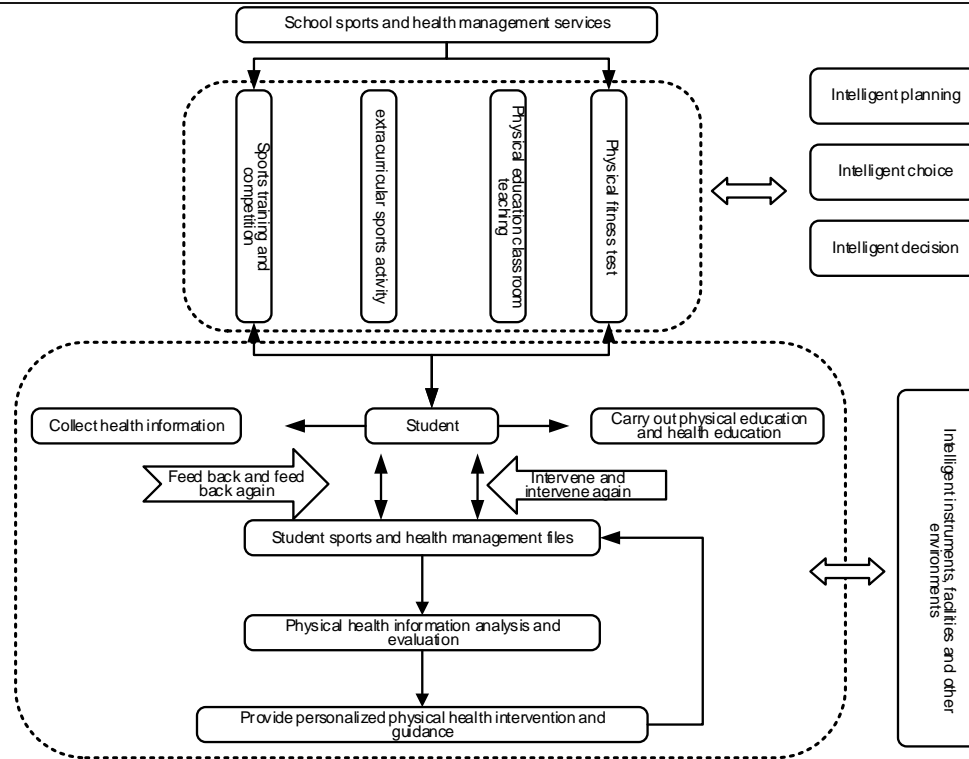


Fig. 2 Implementation path diagram of school sports health service management

5. Feasibility analysis of the implementation of the mode of “the combination of physical education and medical science in colleges and universities”

The implementation of the mode of “the combination of physical education and medical science in colleges and universities” requires certain manpower, financial resources and material resources. Based on a large number of investigations in the early stage, this study believes that the implementation of the mode of “the combination of physical education and medical science in colleges and universities” has a high feasibility.

First of all, the health knowledge education and health information acquisition and electronic files are jointly completed by professional sports teachers (or human movement science care therapists) and medical personnel according to the characteristics of physical education and medical science. Colleges and universities have already been equipped with training facilities such as teachers, classrooms, and multimedia. Therefore, the electronic archives can be reserved in an internal computer system, so that the health information sharing can be realized by physical health technicians and medical personnel in the

distribution system. Secondly, physical examination, health risk assessment and comprehensive assessment of physical quality are completed by physicians and physical health therapists, respectively. Physicians carry out health risk assessment after a physical examination and interpret physical examination reports, while physical fitness testing and assessment are carried out by physical education teachers and health professionals, and the two reports are integrated and improved. Thirdly, after the exercise intervention scheme is jointly formulated by physicians and physical education teachers and health teachers, it can be implemented in the extracurricular activity time of “Sunshine Sports”, and the related sports equipment and gymnasiums in colleges and universities can be better fully utilized. Finally, the fine-tuning and implementation effect of the scheme can also be fed back in the sports activities of college students, and the implementation effect can be evaluated according to the current national requirements of the physical examination of the teaching and staff.

The conditions for the implementation of the mode of “the combination of physical education and medical science have been reached, including school

hospitals (or school clinics), public physical education departments (or physical testing centers), medical staff, physical education teachers or human movement science therapists, college students physical examination, extracurricular activities time and special funds for physical test and examination, etc. At present, the resources integration, personnel organization and coordination, and project implementation can be carried out according to this mode, with high operability and feasibility.

College student health management system --- the mode of "the combination of physical education and medical science in colleges and universities" can provide college students with scientifically circulated, continuously improved, and sustainable health intervention schemes through the health promotion process closed loop. The construction and popularization of the health management system of promoting teachers' health in colleges and universities have already had relatively mature conditions, and at the same time, there has been great feasibility and maneuverability. The mode of "the combination of physical and medical science" in the college student health management system provides a new path for college students' health promotion, so it is necessary to be implemented and popularized.

The promotion of the mode of "the combination of physical education and medical science in colleges and universities" in the college student health management system adopts the strategy of "from small to large, from point to line, and from line to plane". It is suggested to implement this mode by starting from setting up the first "pilot". Then, on the basis of productive practice, colleges and universities that are willing to carry out this mode are selected to further set up multiple points and copy the model, and strengthen the cooperation of points to form "lines", and finally a plane is formed. Besides, the model is optimized according to the actual situation.

The auxiliary system of the mode of "the combination of physical education and medical science" in the college student health management system is established. In order to improve and guarantee the smooth implementation and promotion of the model, a series of supporting organization, training, system and other auxiliary systems are established, including "joint committee of combining physical education with medical science in colleges and universities", "lecture hall of exercise prescription training for medical personnel in colleges and universities", and "demonstration center of

combining physical education with medical science in colleges and universities".

Reference

- [1] Cheng Mingxiang. Combination of sports and medicine: the development mode of physical education reform in medical colleges [J]. Sports culture guide, 2006 (2)
- [2] Xuan Haide. Research on the problem of "combination of sports and medicine" in urban community sports in China [J]. Journal of Military Institute of physical education, 2007, 26 (1): 106-108
- [3] Zhao Tong. Current situation and Countermeasures of fitness mode of combination of sports and medicine in China -- Taking Suzhou "Sunshine Fitness card" as an example [D]. Beijing Sport University, 2016
- [4] Shi Jianwei, Wang Chaoxin, Li Ziyun, et al. Analysis of breakthrough points of community population health management from the perspective of combination of sports and medicine [J]. Chinese general practice, 2021, Vol. 19, No. 1, 1-3, 9, istic, 2021
- [5] Huang Yue, Wu Yating. Path selection of health education in Colleges and universities [J]. China health education, 2019, 035 (003): 279-281
- [6] Tian Xiaojing, Li YAYING. Construction of national fitness service system from the perspective of combination of sports and medicine [J]. Journal of Guangzhou Institute of physical education, 2018, V. 38; No.159(03):64-67.
- [7] Huang Yue, Wu Yating. Design and empirical research on hybrid health teaching mode of combination of physical education and medicine in medical colleges from the perspective of education o2o [J]. China health education, 2018, 34 (12): 93-96
- [8] Liu Xiaohui, Zhang zongguo. Research on College Students' health management with sports as the core [J]. Journal of Shenyang Institute of physical education, 2012, 031 (003): 98-102