

speed can be signal stimulation, selective exercise, etc. The training method of movement speed can be used to narrow the boundary of the badminton training field and shorten the time to complete each exercise. Mobile speed training can adopt various kinds of fast running, 10 to 20 meters of turn-back running, speed training over several landmarks, front and back running, etc. (3) The special endurance training can adopt the intermittent special footwork exercise, with the step, pad step, step, cross step and their comprehensive application; Skateboard drop ball, backhand pick ball, rubbing ball, long ball and other techniques shall be combined with corresponding parallel and cross steps for comprehensive and individual technical training. (4) Special sensitivity training can improve the players' ability to recognize and judge the false action and the ball line through various ball path exercises. Organize more athletes to participate in the competition, adapt to various competition environments, deal with various types of opponents, conduct post-game video analysis for various situations on the field, and conduct targeted quality training. It can be combined with reaction speed and movement speed for actual combat training. (5) In the special flexibility training, the techniques such as badminton ball rubbing, ball picking, and ball drawing require forward bending and side waist movements, so as to use the ability to exercise the forward movement of the waist and the method of waist flexibility. In view of the characteristics of badminton high and long ball, skateboard drop ball, killing ball and other techniques that need to pull the back bow, the flexible method of practicing the backward movement of the waist is mainly used.

Conclusion

Although badminton is a net antagonistic sport, its technique, footwork and other movement techniques as well as the requirements on physical fitness determine its outstanding characteristics of whole body movement and high intensity. Only by formulating scientific and effective special physical training plans according to the technical characteristics of badminton can athletes master and improve their sports skills and create excellent sports results. This paper makes a systematic and in-depth research on the special physical training of badminton under the structure of technical movement by collecting data and investigating. Power quality is the basis of a certain, compared with other project badminton players very tall to the requirement of speed strength, strength, endurance, for they need to attach importance to the development of effective training absolute power, speed quality in badminton training occupies the important position, the reaction speed, movement speed and movement speed is in the process of training for the badminton ball, Speed variable characteristics need to be paid attention to. Speed endurance is also very important, but also need to have a good capacity of aerobic metabolism. The training of physical quality must be combined with the technical characteristics of badminton in order to obtain obvious and effective training effect.

Reference literature

1. **LI Chunlei.** Design and Implementation of Physical Training for the 2012 London Olympic Games of China National Badminton Team [J]. Journal of Beijing Sport University, 2016.

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SIMULATION RESEARCH ON HIGH QUALITY OF OUR NATIONAL FITNESS BASED ON SYSTEM DYNAMICS

Dai Honglei, Qin Yakun

Tianjin University of Sport, Tianjin, China

Abstract. With the coming of the "Fourteenth Five-Year Plan" period, China has put forward new requirements for national fitness. Under the guidance of the policy, the momentum of national fitness in China has been moving towards high quality. This paper uses the theory and method of system dynamics to build a system dynamics model for the high-quality development of national fitness. It uses the existing data to locate and predict the future direction of the high-quality development of the national fitness in China, and more accurately excavates the development drawbacks and future development space of the national fitness in China. The results show that people's acceptance of fitness for all is becoming popular, and the development trend is getting better, but people's awareness of fitness is weak, facilities and services are not perfect, the development mode is unitary, and the project security is not perfect. Therefore, China should base on the fundamental of quality and benefit, promote the reform of fitness for all system, stimulate market vitality, sublimate the concept of fitness for all development, cultivate energy conservation awareness. Only by changing the form of national fitness development, strengthening scientific and technological support for national fitness, and optimizing fitness efficiency, can the implementation of multiple development models more firmly promote the high-quality development of national fitness.

Keywords: National fitness, High quality development, System dynamics.

МОДЕЛИРУЮЩЕЕ ИССЛЕДОВАНИЕ ВЫСОКОГО КАЧЕСТВА НАЦИОНАЛЬНОГО ФИТНЕСА НА ОСНОВЕ СИСТЕМНОЙ ДИНАМИКИ

Дай Хунлей, Цинь Якунь

Тяньцзиньский университет спорта, Тайцзин, Кунтай

Аннотация. С наступлением периода «четырнадцатой пятилетки» Китай выдвинул новые требования к национальным показателям здоровья. Благодаря этой политике «национальный фитнес» в Китае движется к высокому качеству. В статье, на основе теории и метода системной динамики, построена системно-динамическая модель качественного развития национального фитнеса. Используются существующие данные для определения и прогнозирования будущего направления высококачественного развития национального фитнеса в Китае, а также более точно выявляются недостатки названной политики и перспективы развития национального фитнеса в Китае. Результаты показывают, что «спорт для всех» пользуется популярностью в народе, тенденция развития позитивная, однако осведомленность людей о фитнесе слабая, центры и услуги несовершенны, режим разработки проекта целостный, при этом безопасность проекта не идеальна. Таким образом, Китай должен основываться на принципах качества и выгоды, продвигать «спорт для всех» внутри всех систем, стимулировать жизнеспособность соответствующего рынка, сублимировать концепцию «спорт для всех», наращивать темпы реализации проекта. Только при помощи дальнейшей адаптации, усиления научной и технологической поддержки национального фитнеса и оптимизации программы, возможно способствовать достижению желаемых результатов.

Ключевые слова: национальный фитнес, качественное развитие, системная динамика.

1. Introduction

The promulgation of a series of policy documents on the high level advancement of national fitness has brought numerous new opportunities. It regards physical and mental health of the general public and happiness as the goal of the whole party in the new period, and regards a healthy China as an important guarantee for the country's prosperity. It comprehensively explains the social function of sports[1,42], Expand the coverage of the public sports services for fitness for all, serve and benefit the whole people[2], and plan new goals for exploring the high-quality development of China's national fitness. Currently, the future development path of national fitness and universal health in the new era of China and the policy content of national fitness and integration[3,41] and development of multiple formats are becoming increasingly clear[4,48], which shows that China has a high degree of recognition for the national fitness program. With the help of theory, It can help us clearly analyze the dynamic changes of each stage, aiming at the high level development status of fitness for all in China, dynamics model of national fitness's high-quality development, carries out simulation according to the existing data, estimates the high level development trend of fitness for all in China, grasps the future development trend, helps formulate the corresponding strategies more accurately, and provides favorable basis for the high level advancement of China's fitness for all.

2. Methods

2.1. Design

System dynamics was founded in the 1950s by J.W. Forrester of Massachusetts Institute of Technology. Qualitative analysis is dominant in problem definition and conceptual model[5,45], while quantitative analysis is dominant in model formation (formal model construction), model analysis and verification, policy analysis and design, and implementation.

2.2. System boundary

Through the analysis of the established indicators and expert interviews, the main factors of high-quality development of national fitness include four aspects: stakeholders, finance, learning and growth, and internal processes,

which can be summarized into four systems: stakeholder system, financial system, learning and growth system, and internal processes. as shown in Figure 1. The national fitness high-quality development system dynamics simulation period is 2000-2030, the time step period is 1 year, and the original data period is 2015-2020.

2.3. Causal loop model of high level advancement of national fitness

The causal loop model of high level advancement of national fitness (Figure 1) is an effective means to reflect the relationships among variables more intuitively by relying on system dynamics. This figure is drawn by the software vensim of system dynamics, which presents nonlinear characteristics and is easy to produce synergy beyond the normal level[6,43]. There are 67 variables in the whole system, and there are many loop relationships among them. This positive and negative loop relationship casts a complex system with high level advancement of fitness for all.

2.4. Flow chart of high level advancement system of fitness for all

Dynamic flow diagram (Figure 2). At the same time, the system also presents a transition from qualitative analysis to quantitative analysis, which makes the development trend of each factor and its influence on the whole system clearer.

3. Discussion

With the passage of time, people's awareness of national fitness has increased, showing a positive growth and a good trend. However, the increase rate is slow, the number of participants is not optimistic enough, the high quality fitness for all among different regions is uneven, the facilities are not updated, and the traditional way of participating in national fitness is single.

4. Conclusions

1. Improve the development concept of national fitness, based on inclusive quality.
2. Promote the reform of the national fitness system and stimulate the market vitality.
3. Change the advancement form of fitness for all and cultivate the awareness of energy conservation.
4. Strengthen the technical support of fitness for all and optimize the exercise efficiency.

