
Scientific and rational analysis of fitness equipment design

Lizhen Liu

Wenzhou Vocational & Technical College, Wenzhou. 325035, China

1918427983@qq.com

Abstract

The arrival of the information society, greatly changed the human way of life, work, entertainment. The improvement of human living standard, the change of information society to human life style and modern people's attention to health make modern people pay more attention to personal and family fitness activities than ever before. The information society brings more convenience to human beings and satisfies their multi-level entertainment and communication needs. At the same time, human nature makes modern people become obese, depressed, impetuous or physically infrequent, which makes human beings have to face more health troubles. Therefore, people pay more attention to their own health, and exercise as an important means to obtain a healthy body to practice.

Keywords

Fitness equipment, product design; The scientific nature.

1. The background

The design of fitness equipment is scientific and reasonable. On the one hand, it is reflected in whether it can produce more efficient fitness effect from the aspect of exercise physiology. On the other hand, is better from all aspects of the fitness equipment is suitable for the use of bodybuilders, whether from the physical features of the fitness, and the characteristics of the exercise, whether from the aspects of bodybuilders psychological feelings, whether from the different ways in the performance of the fitness aspect, a more reasonable to determine the function of fitness equipment, size, parameters, interface, use way, to achieve fitness equipment use convenience, comfort, safety and rationality. It is based on this second aspect that the analysis and research on the ergonomic theory of household fitness equipment carry out a comprehensive and systematic research on fitness equipment, so as to better match fitness equipment with fitness workers and better fit for their use.

Good and reasonable functional combination of fitness equipment is related to the exerciser's exercise mode, fitness experience and cost control of fitness equipment. It is also an important embodiment of scientific design of fitness equipment. The functional combination of fitness equipment should be centered on the fitter and balanced on the basis of careful analysis of the physiological and psychological needs of the fitter in the whole fitness process. In order to better realize the main functions of household fitness equipment, the auxiliary functions of fitness equipment should be reasonably expanded according to the characteristics of fitness equipment and the needs of fitness workers. The functional combination here is not specifically referring to the functional combination between different fitness equipment, but mainly refers to the combination between the main function of fitness equipment and auxiliary fitness functions.

Home fitness equipment mainly in the imitation of natural fitness exercise at ordinary times, people to achieve the purpose of fitness, so the choice of fitness equipment movement direction should be in when people do not use the fitness equipment to exercise on the basis of the direction of the exercise habits, on the basis of the human body exercise physiology, aiming at more conducive to people's health to carry on the design.

2. Appearance analysis

Color not only shows the appearance of the product, but also the spirit of the product. The color design of household fitness equipment will have an important impact on improving its visual aesthetic effect and the psychological feeling of fitness workers. This asks the colour of domestic expenses fitness equipment and use the element such as the object, fitness function, environment that occupy the home to coordinate well, build a kind of unified and harmonious feeling for fitness person as far as possible.

The so-called emotional design is not to make the product have some kind of emotion, but through the design of the product, mobilize some kind of emotion, trigger some kind of emotion, and then make people and the product have some kind of connection. Norman divided people's cognitive and emotional systems into three levels: instinct, behavior and reflection. On this basis, he clearly divided design and design objectives into three levels: instinct, behavior and reflection. The so-called instinct layer, is the first feeling of the product; Behavior layer, focusing on the user's use of the product; Reflection is the highest level, which refers to the comprehensive response of users to the first two levels under the influence of comprehensive factors such as understanding, experience and cultural background. Starting from these three levels, the relationship between fitness equipment and users is analyzed and studied, and the fitness equipment is developed from an emotional perspective. Only in this way can such products better meet people's emotional needs.

The proposal of emotional design has inspired countless designers to re-examine the relationship between products and people, products and environment. The highly developed technology has brought great convenience to people's life, but product design cannot rely on the superposition of high technology to serve consumers. Introduce emotional design concept into fitness

In the design of fitness equipment, besides meeting people's basic fitness needs, the interaction between fitness equipment and users should be fully considered to not only achieve the purpose of effective fitness, but also meet people's growing spiritual needs, which is also the development direction of future fitness product design.

3. The product carries various information such as shape, color and texture

Modeling, color, texture these information also constitute the emotional elements of the product, from different aspects to convey different information to the user.

Traditional fitness equipment design focuses on the structural relationship between parts and components, which also has a certain constraint on the external modeling. With the development of technology and technology, new processing methods and processes are applied to fitness equipment. This limitation is gradually broken, making its form become more abundant. Exercise itself is a physical activity, people in the process of fitness easy to produce a sense of fatigue. Therefore, on the basis of realizing its basic functions, fitness equipment can make use of external forms to generate a sense of intimacy for users, and then make people relaxed. For example, organic styling is easier to approach than angular geometry. In addition, through the shape of the external form of the product, but also to enhance the spiritual taste of the product, so that people have a kind of pursuit of the product.

The color of products has a profound impact on people's psychological feelings and emotional state when they watch and use products. Different colors can bring consumers different feelings and express different emotions. Color also implies the use of consumer products and matters needing attention. In the design of the treadmill interface, for example, the emergency stop button is red and the normal open button is green.

The comprehensive application of different materials can enrich people's visual and tactile feelings. Of material choose go up, fitness equipment mostly USES the combination of the material such as metal, plastic and leather. Metal is the main material of fitness equipment, showing the modern sense of products, strength and tenacity, but also appears bulky; All kinds of plastic materials show products

light, delicate; Leather material in the application of fitness equipment gives a person a kind of comfortable feeling.

People must have physical contact with products in fitness activities, and different tactility will bring different psychological feelings to people. Good tactile sense of design, can improve the applicability of the product and agreeableness. For instance in the handle design of equipment such as exercise bike, treadmill, use the face to have fine grain more inferior smooth plastic. This material gives people a good sense of touch, makes people feel a sense of security when holding, and makes people happy to touch.

4. Market status of fitness equipment

The current sports fitness equipment market is dominated by fitness and entertainment equipment. Fitness equipment is mainly in recent years into the market for a variety of functional trainers and a variety of dumbbells, barbells, pullers, etc. Entertainment equipment to single - person exercise equipment, but intellectual equipment accounted for a considerable proportion. Such as: jump ball, hula hoop and other fitness equipment type of play is less, health care equipment in the overall proportion is not large, but the kind of concentrated in a variety of massage equipment more, more suitable for the elderly consumption. Competitive equipment to maintain the basic traditional categories, fewer new varieties.

From the general distribution of equipment types, due to the micro-regulation of the market, basically and reasonable. From the perspective of the questionnaire of physical fitness, the physical health of 67.4%, the general constitution is accounted for 30.8%, the system of the weak 1.78%, the physical conditions of equipment types of population distribution and the distribution of the trend is close to, but from the perspective of the type characteristics of equipment there are unreasonable, such as: children's recreational equipment, few types of equipment can make physical activity directly. The hula-hoop movement, once popular, shows children's hunger for fitness equipment over the years. With the development of society, people's life rhythm is accelerated and the intensity of repetitive labor is constantly increasing. For the unbalanced bone load, cervical spondylosis has become an occupational disease for scientists and teachers. Breast buttoning, hump back and wearing eyes have become the patent of top students. Therefore, to accelerate the development of morphological fitness equipment so that people can make up for the adverse impact of work and study on bone development through fitness activities in their spare time should be the focus of the development of sports fitness equipment.

Fitness equipment market shows the following price trend, below 100 equipment concentrated in entertainment equipment, such equipment more use of plastic, wood and other lower prices of raw materials, and small area, light weight, so the price is lower. 100 ~ 1000 yuan of equipment mainly focus on a variety of massage of health care equipment, although the price of this kind of equipment is high, but at the beginning of the commodity, category is appropriate, for the small health family is acceptable, for most consumers a little far-fetched, the questionnaire survey shows. The average monthly income of ordinary people is about 752 yuan, and the price of fitness equipment is 176.42 yuan, which is less than 600 yuan. Accordingly, inside market of all kinds of massager predicts period of time to be like not to adjust price inside henceforth, although be unlikely unsalable, but can appear the trend that slides gradually.

In recent 2 years, the price of various functional exercisers is too high, which is far from the economic ability of ordinary people. There can be no prospect of strong sales. With the advent of the national fitness boom, the popularity of equipment demand prospects. Faced with such a huge opportunity, such as businesses do not quickly adjust the variety of equipment, reduce the price, with the expansion of similar types of sporting goods, a variety of fitness forms and content of the perfect, will lead to sports fitness equipment market transfer and flow. Therefore, according to the level of China's economic development, for the consumption of ordinary people, as soon as possible to adjust the price of equipment, sports fitness equipment market development is the top priority.

The area of all kinds of equipment is large on the whole, which is not suitable for the living conditions of Chinese residents. With the improvement of living standard and the improvement of living conditions, the urban courtyard living environment has become a history, replaced by unit houses. According to the survey results, the per capita living area of ordinary people is 10.9m². The average area of household fitness equipment is 0.531m². In modern life, a family of three is the family unit, and the area of fitness equipment accounts for about 10% of the living area. For the public, small sports and fitness equipment should be taken as the development direction. Firstly, the area of equipment should be suitable for family exercise. With the improvement of social mechanization, the reduction of labor intensity and the enhancement of sports consciousness, family sports and fitness will gradually become an important part of people's beautification of life, construction of family atmosphere and improvement of life quality. Therefore, small and diverse sports fitness equipment popular market will become a trend.

5. The necessity of ergonomics

5.1 Necessity of man-machine engineering

Ergonomics research includes human factors, machine factors and environmental factors. The main purpose of ergonomics research is to achieve the overall optimization of human-machine-environment system by revealing the law of the relationship between human, machine and environment.

The research and application of ergonomics are more and more extensive. Any product system or survival system needs to meet the physiological and psychological needs of people, and its design and development need to be guided by man-machine engineering theory to maximize the efficiency of man-machine-environment system. The design and use of tools, machinery and equipment as a means of production, and the improvement of the environment of production sites, regardless of the industry sector; The improvement and research and development of the operation mode to reduce the work load; Reasonable arrangement of work to prevent monotonous work; A security system designed to prevent human error; In order to improve the operating performance, comfort and safety of products, the design and improvement of the whole system can become a research subject of ergonomics.

Through the analysis, it can be found that the change of lifestyle makes it necessary to carry out fitness exercises with household fitness equipment in the family. The improvement of people's living consumption level, the change of health and fitness concepts and the pursuit of body aesthetics have created material conditions and purchase demands for fitness equipment entering families. Broad market prospects, so that the household fitness equipment has great potential for development. At the same time, this also puts forward higher requirements for the design of household fitness equipment.

Home fitness equipment market potential is tremendous, various types of fitness equipment, although now in the market, but most of them only pay attention to the design of function and structure, the patrons of sports physiology and sports psychological care is not enough, the lack of a full range of care, to the user in the man-machine interface is not reasonable, functional size is not science, exercise design problem of higher security by sex. In a word, the existing design of household fitness equipment lacks of systematic analysis and consideration of man-machine adaptation.

Fitness equipment above design problems of the key is in the design of home fitness equipment lack of man-machine engineering design consciousness, lack of fitness person centered design concept, lack of fitness equipment man-machine engineering theory analysis and guidance, and domestic existing home fitness equipment lack of systematic research in the theory of the man-machine engineering design. Therefore, it is necessary to analyze and study the ergonomics theory of household fitness equipment. Through the research of this subject, the fitness-centered design principle will be established to comprehensively improve the fitness relationship between household fitness equipment and fitnessers, improve the coordination relationship between fitness equipment

and home environment, and then make a certain contribution to improve the international competitiveness of domestic fitness equipment manufacturers in China.

5.2 Ergonomic analysis

Man-machine system is an interrelated system composed of people and the machines they control. Any man-machine system must be in a specific environment, so it is also called "man-machine-environment" system. In the man-machine-environment system of fitness equipment, the fitter and fitness equipment are the most important components of the system. The matching degree of man-machine relationship between them is directly related to the rationality of people's exercise, the fitness effect, the scientific rationality of fitness equipment and people's recognition of fitness equipment. It is necessary to combine the software system and hardware of the fitness equipment when analyzing the man-machine relationship of the domestic fitness equipment. "The fitness equipment without software is completely the same as the computer without software", which fully illustrates the importance of software to fitness equipment. Only with a good software system, it is possible to make the man-machine engineering as the guide of the fitness equipment design reflected by the scientific realization.

5.3 Machine-environment analysis

From the use time and idle time ratio of fitness equipment, fitness equipment most of the time in idle state, that is to say, most of the time fitness equipment is placed at home. This process, what should pay close attention to is the harmonious problem between the put of fitness equipment and household environment. Different household fitness equipment may conform to people's aesthetic law through design and modeling, but because of its nature of use and design style, it is bound to have a sharp contrast with furniture and household appliances, and impact on the family's sense of warmth. Be in charge of when using fitness equipment to put in the home, can design a "coat" for fitness equipment, its cover rises. Coat can use the material that cloth pledges or copy cloth, undertake elaborate design to its colour, design, modelling, if choose warm color or delicate color, the collocation that notices and household color, the goal is to live in an environment photograph to coordinate.

6. Conclusion

In the process of fitness, fitness equipment is exposed and working. When people are doing fitness, they hope to gain larger activity space and broader vision. A lot of fitness person move fitness equipment to the sitting room or balcony undertake exercising. Therefore fitness equipment in the design should reflect good mobility. The exterior configuration of domestic expenses fitness equipment and colour collocation besides the psychological demand when adapting fitness, still should pass the design of high grade, make its try one's best and live in environmental photograph to coordinate, this is in the relation of domestic expenses fitness equipment and household environment, very important respect.

References

- [1] Carlos Velasco,Sarah Hyndman,Charles Spence. The role of typeface curvilinearity on taste expectations and perception[J]. International Journal of Gastronomy and Food Science,2018,11.
- [2]Ştefan GHIMIŞI, Dana NICULA. PRODUCT DESIGN PRINCIPLES[J]. Fiabilitate și Durabilitate,2014,1-Suppl(1).
- [3]LIVIU NEAMȚU,ADINA CLAUDIA NEAMȚU. LICENCE, DESIGN AND MARKETING EXPERIENCE RELATING TO A PRODUCT OR PROCESS[J]. Analele Universității Constantin Brâncuși din Târgu Jiu : Seria Economie,2013,5(5).
- [4]Phillip A. Sanger. Integrating Project Management, Product Design with Industry Sponsored Projects provides Stimulating Senior Capstone Experiences[J]. International Journal of Engineering Pedagogy (iJEP),2011,1(2).

- [5] Luis Cândido, Wilson Kindlein, Renan Demori, Larissa Carli, Raquel Mauler, Ricardo Oliveira. The recycling cycle of materials as a design project tool[J]. Journal of Cleaner Production, 2011,19(13).
- [6] Fatimazahra Guini, Abdellah El Barkany, Abdelouahhab Jabri, El Hassan Irhirane. An Approach for the Evaluation of a Product's Process Planning during the Design Phase through a Group Multi-Criteria Decision-Making[J]. International Journal of Engineering Research in Africa, 2010,921(1).
- [7] Antti Ainamo. Coordination mechanisms in cross-functional teams: a product design perspective[J]. Journal of Marketing Management, 2007,23(9-10).