

2014

# BioTechnology

*An Indian Journal*

FULL PAPER

BTAIJ, 10(24), 2014 [16352-16359]

## Research and design of fitness management system for Hubei province public servants in China

Luo Qi

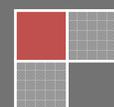
College of Sports Engineering and Information Technology, Wuhan Sports University, 430079, (CHINA)  
Email: ccnu\_luo2008@126.com

### ABSTRACT

Public servant refers to the people who work in the government institutions of various levels and execute the mission of state administrative functions and powers. Practice had shown that Public servants need to own health-related fitness (such as physical and psychological) to guarantee them competent in the posts. However, the properties and characteristics of Public servants' work easily lead to their fitness problems. Computer technology and psychology were integrated into the psychological health education and the features of Public servants' health were studied. According to the needs of physical health construction of Public servants, Fitness Management System for Hubei Province Public Servants in China was developed. The general structure of system overview, system modules classification, characteristics of the system and system securities were introduced in the paper. ASP.net and SQL Server software were used to realize Fitness Management System for Hubei Province Public Servants in China. This testing system could be directly connected to the database and the test result confirms that this is a set of standardized, easy-expand system.

### KEYWORDS

Public servants; Fitness management system; SQL; ASP.net.



## INTRODUCTION

Public servant refers to the people who work in the government institutions of various levels and execute the mission of state administrative functions and powers. Practice has shown that Public servants need to own health-related fitness (such as physical and psychological) to guarantee them competent in the posts. However, the properties and characteristics of Public servants' work easily lead to their fitness problems. Firstly, Due to the heavy working strength, long working hours, lacking of physical activities, the public servant's rates of metabolism and basic metabolism is lower, blood circulation is worse, the functions of human organs and main joints is decline, which easily make them got chronic occupational diseases, such as obesity, angiocardopathy, arthritis. Secondly, the public servant' ability which resists disease and adapts to environment become decline because of many social intercourses, stimulation of tobacco and wine, the excessive intake of all kinds of high-calorie or high cholesterol foods. Finally, the fast pace of life, mental nervous have led to various psychological problems associated with job stress increased.

With the improvement of information technologies, particularly the explosive development of Internet, the consultation and evaluation of physical health for public servants can be attained through internet. Current physical health problems of public servants have become more complexed. We have proposed on-line test through internet handle the complex physical health problems electronically. Popularity of personal computers, advanced Web technologies and the emergence of visual programming language have made the development of Web - based Fitness Management System for Hubei Province Public Servants in China possible. Fitness Management System for physical health enables many Public Servants to have on-line assessment at the same time, which greatly improves the efficiency and accuracy of data collection and provides participants with a scientific solution. So this system has greater practical significance and application prospects.

## SYSTEM ENVIRONMENTS OVERVIEW

Browser/Server structure Model is adopted for Fitness Management System for Public servants. The server of the system uses a Microsoft Windows Server 2012 operating system and Web server select IIS 7.0. Systems developing tools are: Visual Studio 2013, the ASP. NET Framework, the C programming language and the database uses a relational database, SQL Server 2014. The interface between database and application is ADO.net. The system uses the C# system logic control, achieve code compatibility, scalability, so do optimized code structure, in accordance with the idea of object-oriented design, try to program object-oriented, makes the function of each module relatively clear and independent, enhanced preparation and control of the software.

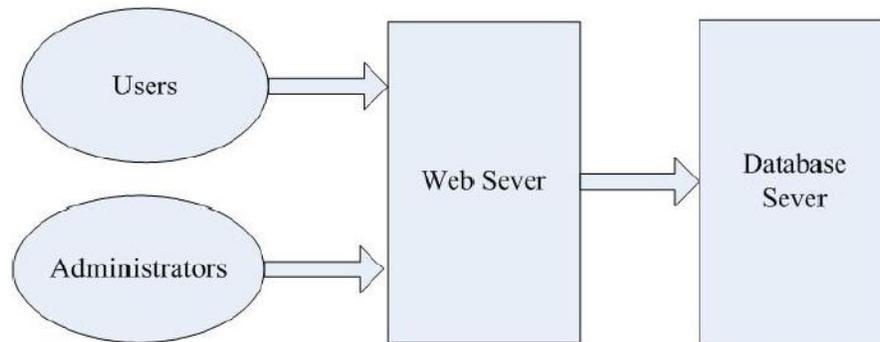
Client with browser mode makes it easier to use the management system; clients do not need to install special client software, so the whole system work of management maintenance is significantly reduced. The browser as a unified information access tool coupled with the user authentication mode, avoiding the access to various kinds of information when data needs to start, enter a different application programming tools designed for the shortcomings of the system, it is more convenient for users and managers to use computers to get the information you want. (Users access the server, Programs provided by the test could be obtained.)

## THE OVERALL STRUCTURE OF THE SYSTEM

### The basic structure of the system

Fitness Management System for Public servants use Browser/Server mode. Clients adopt browser as a unique information access tool, coupled with the user authentication mode, avoiding the access to various information and data which is the need to boot into a different programming tools to design application systems, it is more convenient for users and administrators to use computers devices

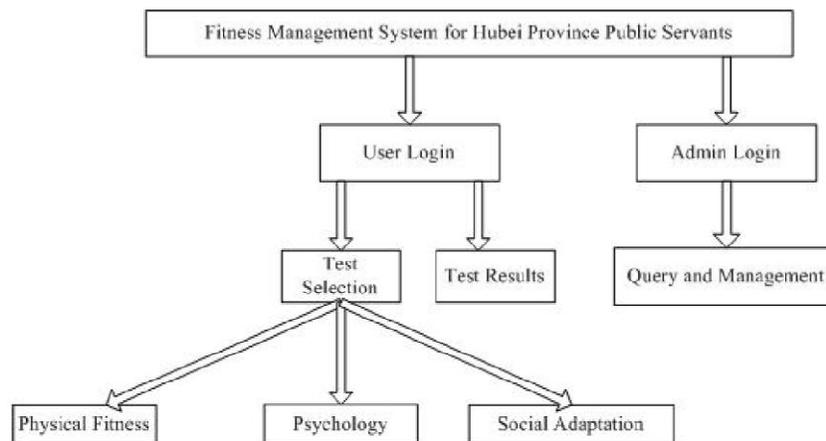
getting the information they need. Users access the server and obtain services provided by the program. Its system model diagram is shown in Figure 1.



**Figure 1: System model**

### Modules of the system

In order to achieve the measurement of Fitness health of Public servants and operate the results, analysis, assessment, evaluation, exercises prescription and so on. The system is divided into physical fitness testing, psychological testing and social adaptation tests based on the basic structure of the system see the Figure 2.



**Figure 2: Modules of the system**

#### (a) User login module

Login module is used to authenticate users' identity and prevent illegal users from entering the system. Before the user entering the system, they will go to the website's home page. Then inputting the user's name, password and verification code and click the "login" button, system will judge whether the information entered is correct or not based on the user's name and password. If the user's information was wrong, the system will present the prompting information. If he/she wants to clear the inputted information, they can click "Cancel" button.

#### (b) Physical test module

With the help of a variety of measuring instruments online, the Public servants will get the corresponding test data, the data will be filled out online, and the system will give the final score and evaluating result and provide the appropriate exercise prescription. The test indicators include: (1) body mass index (BMI), which is used to reflect the Public servants' fatness. (2) Harvard's step test, which

mainly tests the performance of Public servants' hearts and lungs. (3) Standing long jump, mainly reflects lower extremity jumping ability. (4) 4 × 10 meter shuttle run, mainly reflects the status of Public servants' agility. (5) 800 meters (female) / 1000 meter race (male), finishing the course to get the time evaluation of Public servants' muscular endurance. These indicators reflecting the physical fitness can be improved through reasonable lifestyle and physical activity, so these physical indicators have practical significance for the Public servants, and it also benefits us to provide Public servants practical guidance. (6) Nowadays, the overall situation of lifestyle and physical activity, we lack the information of the Public servants. So we added a lifestyle and physical exercise status questionnaire in the system. The questionnaire includes three parts: Basic information, lifestyle and physical exercise. The basic information includes the subject's physiological parameters and some basic demographic indicators, Lifestyle is mainly about the condition of food and other basic living conditions. In the part of physical exercise, we focus on how much time the subjects spend on physical activities and so forth. With this questionnaire we can understand the levels of attention and investment of the current Chinese Public servants spending on physical activities timely and comprehensively.

### **(c) Psychological test module**

The indicators of the original physical measurement system are mainly physiological ones, in order to improve this system, we mainly add the content of psychological measurement, including two commonly used indicators of mental health: states of mood, and working condition. (1) States of mood is a weaker emotional state but lasting longer time, it makes all the emotional experience of individuals infected with some kinds of colors. States of mood affects the individual's work, living conditions. Studies have found that the incidence of mood and individual's moral quality have a significant correlation. Therefore, the individual's state of mood are important for the prediction and analysis of their physical and mental health. The system uses PMOS, which is short for the profile of mood states. It was made by Mike McConnell, who prepared in 1976. Later, Grove had simplified it and added the dimension of "the emotions and self-esteem ". Therefore, the individual's state of mood are important for the prediction and analysis of their physical and mental health. It makes assessment for the mood of the individual from tension, depression, anger, energy, fatigue, confusion and self-esteem., who introduced the revised scale and the scale of the Chinese version of the norm. Series of studies at home and abroad show that the simplified scale has high reliability and validity (2) Working conditions directly affect the individual's work performance. As the main elements of daily life, work has a direct impact on the mental health of individuals, some studies show that individual's job burnout effects one's emotional conditioning To know more about Public servants' working condition, we introduced Maslach Burnout Inventory-General Survey into the system, which can be divided into emotional exhaustion, cynicism and low sense of achievement. These three dimensions have 15 projects, of which 6 are reverse-scoring projects.

### **(d) Social adaptation test module**

This module is used to investigate the ability of Public servants' dealing with relationships between people and integration level into the community they are working in. We translated and revised the foreign scales, developed social support and social adaptation scale. (1) There are close contact between social support and mental health of individuals, the study found that social support and the individuals' negative emotions were negatively correlated, and have a moderating effect on the loneliness of individuals<sup>[15]</sup>. Once the individuals suffered an accident, the social support is an important factor that affects individual recovery<sup>[22]</sup>. As the national public officials, Public servants received support are both from top-down and also bottom-up content, then whether this support is effective or not? Whether Public servants reasonably use these supports? Therefore, we introduce social support rating scale (SSRS) made by Xiao shui yuan into this system, the scale can be divided into three dimensions: objective support, subjective support and utilization of support. Not only to examine social support system of the subjects, but also to test the validity of using the support. Objective support refers to the support getting from people around or getting practical support in social systems, subjective

support is the individual's own experience of external support and the utilization of support is mainly related to the use of various supports. (2) Social adaptation is the course of the individual's gradually accepting norms of society, codes of conduct, social and cultural, and it has a significant impact on the individual's survival and development<sup>[20]</sup>. Public servants play a nexus role in national life, therefore levels of Public servants social adaptation not only affects their general state of social life, but also their job performance and career development, so it has a significant impact. Therefore, the introduction of the scale on the measurement of their social adaptation is necessary. In the system, we introduce social adaptation scale, which includes interpersonal adaptation, adaptation and learning environment – these 3 factors with 21 projects.

#### (e) Administrator login module

In the module setting administrative privileges, administrators can update, delete, add and query individual users and lower-level administrator's information. This is a back-up function to prevent the system's database from losing due to management errors, it also ensures that the evaluation of survey results confidential.

### SYSTEM SECURITIES

Fitness Management System for Hubei Province Public Servants is a Web-based open one, it can be accessed by any computer devices, and sensitive data is not allowed to be changed or deleted optionally, so maintaining the security of this site is very important. Security issues to be considered during Program developing are: preventing non-registered users logging to use the system preventing illegal use of administrator privileges, preventing unauthorized people from viewing information, data backup and security, and user and administrator safe landing and exit, etc. The system is mainly designed for the following aspects of security see TABLE 1.

TABLE 1: System securities

Number	Aspects of security
1	Managed Objects
2	Secure transmission
3	Data collecting
4	Data encrypted storage
5	Access control
6	User or Manage authentication
7	Web Browse

The details are as follows:

(1) The role of security controlling. Rights management of detailed security. This system is managed according to the user's role. These roles includes: System administrator, the general evaluating staff. General evaluation can carry on related project evaluation, and users can check their own survey results, but cannot change, delete, evaluate other viewers. Not within the purview of the staff cannot access the system or make online evaluation. System administrators can query, add, delete the evaluation test result of the general staff, but these survey results must be kept strictly confidential. In order to explicit the responsibility of staff, there will be a detailed record of the system log, the log records the information related to browsing and evaluation. Which make the system securer, so that the system can work securely and reliably.

(2) Database Security. Users can not directly access the data layer, logic layer and data layer must get the required data to ensure security of the database.

(3) The system log. Create a system log to record the user's login time and all changes, deletions, and abnormal operations.

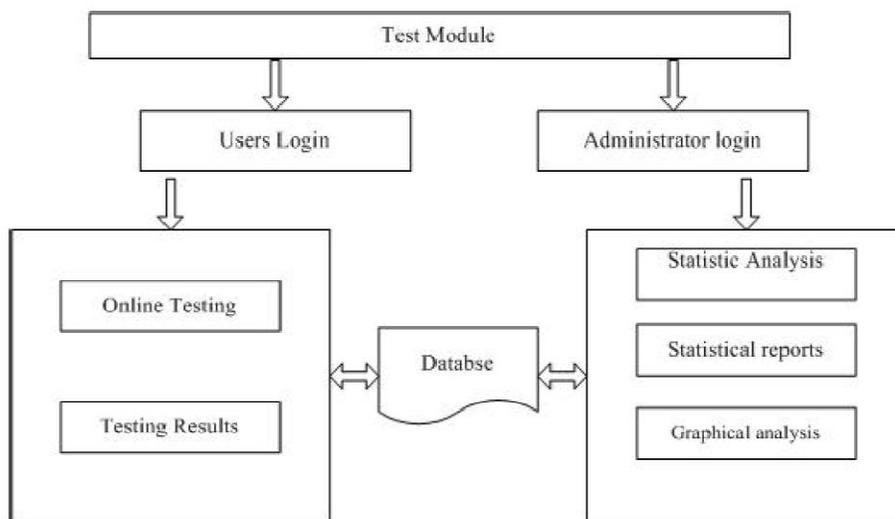
## CHARACTERISTICS OF THE SYSTEM

Physical evaluation of the existing civil service system, the outstanding issue of the existing one is that they usually consist the body shape, function and quality indicators without mental health status of Public servants, social adaptation evaluation indicators. Therefore, we should pick some functional indexes from the original national body evaluation index system to create a new reliable, comprehensive physical evaluation system for the Public servants. With our experience about the development of the database management system, we simplified the process of data analysis of the sports science and psychology, which also improves the efficiency and accuracy of data analysis, so the system should reach the following goals:

(1) In order to improve the physical fitness evaluation index system, the researchers developed a civil servants physical health evaluation system including lifestyle and physical activity survey, evaluation of social support, social adaptation, evaluation of mood states, working status evaluation. Using evaluations we can save the data, classification and data printing, realizing the computerization, automation and psychological records management information of the system. The results of test data analysis and feedback can be intelligent. This system can accomplish all the above data processing tasks, reduce the workload of psychological testing, and improve the efficiency of the staff and the accuracy of the data, timeliness, and completeness.

(2) Make the test results and classification and analysis accurate and comprehensive. This system can improve the readability and aesthetics of personal physical fitness test report.

(3) The system is divided into the system administrator and general testers. System administrator has full rights including the management of personnel data and testing queries. System administrators can survey, add, delete, backup and restore the results of each module for data query. Project also includes the results of the test generating tables or EXCEL file (. xls) into SPSS statistical software, statistical analysis of data for future work, but also greatly enhance the work efficiency. General testers can query, evaluate and make other simple operations, but don't have right to modify any data or data backup or restore. History management also increased data integrity and security. Authorized the establishment of classification system, the system embodies the openness and sharing facilitating the use of different users, expands the scope of use, and better ensures data integrity and security. Data processing structure design see Figure 3.



**Figure 3: Data processing structure design**

(4) We try to add lifestyle and physical activity survey, evaluation of social support, social adaptation, evaluation, mood states assessment, work status in the evaluation of physical health of civil service.

(5) This Public servants management system can make physical health Public servants tested, evaluated, monitored and managed online.

(6) Use the Internet technology to make civil servant's physical health management become visual, interactive, participatory management, and promote physical health of the scientific Public servants more scientifically and dynamically.

## CONCLUSIONS

The defects of any software can be found only after using, testing is to measure and improve the quality of the software, it is an important part in the process of engineering design, implementation and maintenance. To make sure the consistency and compatibility of the Public servants system's requirements and the actual results of the software implementation, we tested it many times and made a lot of improvements, although there will still be many flaws shortcomings inevitably, but it can show out the system is practical and easy to operate. With this system, not only leaders from relevant functional departments can make the health education more conveniently and efficiently, but make a comprehensive analysis. The technology of this system is advanced, there are optimized network design, security, data management, and efficient information management, friendly interface, image-rich, easy to understand, server security, high WINDOWS XP operating system, SQL Server distributed large databases for database management system that allows data security to be effectively protected. The system also has stability and applicability of the results, which makes the psychological evaluation of Public servants work more convenient and operable. For those whose results of the tests have problems, this system can come up with practical exercise prescription, reasonable and professional psychology recommendations. Simultaneously, working on a number of Public servants physical health-related evaluation can improve the efficiency of measurement.

## REFERENCES

- [1] S.M.Archana, H.Melvyn, B.Eric, M.Michael; Effects of Physical Activity on Cognitive Functioning in Middle Age: Evidence From the Whitehall II Prospective Cohort Study, *American Journal of Public Health*, 2252-2258 (2005).
- [2] B.Antony, M.Arnold Michael, A.Texas; Full-Scale and Short-Form of the Profile of Mood States: A Factor Analytic Comparison, *Journal of Sport Behavior*, 33(4) (1972).
- [3] P.An, J.H.Xu; Study on the Physical Condition of The Civil Service in Zhejiang Province, *Journal of Beijing University of physical education*, 12, 1660-1662 (2005).
- [4] H.B.Dai, J.Q.Gu; Physical Fitness Status of Public servants, Wujiang City, Jiangsu Province, *Journal of Harbin Institute of Physical Education*, 3, 122-123 (2006).
- [5] J.Y.Eun, K.S.Kay; Verification of the Profile of Mood States-Brief:Cross-Cultural, *Journal Of Clinical Psychology*, 62(9), 1173-1180 (2006).
- [6] M.N.Fiona, S.Leonard; *American Journal of Public Health*, 1, 332-340 (1996).
- [7] H.L.He; Effects of Walking Exercise on Physical Fitness of the Civil Service in Jiangsu Province, *Journal of Nanjing Institute of Physical Education*, 6, 9-12 (2008).
- [8] N.Li, X.M.Zhang; Study on the Relationship between Social Support and Pressure of College Students, *Institute of Physical Education at Suzhou University*, 9, 20-28 (2007).
- [9] L.Liang, Y.H.Wang; Investigation of Body Composition of Beijing Municipal Party Committee Office Staff, *Journal of capital Institute of Physical Education*, 3, 55-57 (2006).
- [10] B.Liang; Investigation and analysis of the Liaoning Provincial Government officials' Constitution, *Liaoning Sport Science and Technology*, 1, 31-33 (2009).
- [11] R.X.Li; Officials in Hunan province's health and fitness behaviors of the investigation, *Journal of Adult Education in Sports*, 6, 36-38 (2005).
- [12] C.F.Lu; Exercise and Diet Intervention on Male Experimental Study on the Effect of High Blood Lipids and Body Mass in the Civil Service, *Physical Education and Science*, 6, 86-90 (2008).
- [13] A.Q.Miao; Investigation on Constitution of Jiangsu Provincial Public Servants, *Journal of Agricultural Education*, 6, 86-90 (2008).

- [14] Q.H.Sun, J.D.Dai; Agents Physiques Research, Journal of Beijing University of Physical Education, **11**, 1518-1519 (2007).
- [15] B.Stephanie, A.B.Kimberley; Loneliness, Attachment, and the Perception and Use of Social Support in University Students, Canadian Journal of Behavioural Science © 2011 Canadian Psychological Association, **43(1)**, 40–51 (2011).
- [16] J.Tong, G.Y.Li; Ningbo physique Monitoring Result Analysis of 560 Officers, Sports Science and Technology, **1**, 55-57 (2005).
- [17] J.P.Wang, W.J.Lin, Z.G.Chen, J.N.Cui, Liu Jie; Trial Report of Concise POMS Mood Scales in China, Psychology journal, 110-114 (2000).
- [18] B.Wang; Intuition in Handball Situation Decision of Experimental Study and Preliminary Construction of Sport Intuition Ttheory, Beijing University of Physical Education (2002).
- [19] X.D.Wang; Associated with the Authorities and Enterprises in Wuhan Cadre Physique Lifestyle Study, Hubei Education Press, 171-180 (2008).
- [20] R.Yan; Adults with Learning Disabilities and Social Adaptation, Progress in Psychological Science, **5**, 569-575 (2005).
- [21] F.L.Yin; Effect of Physical Exercises of Public servants, Xuhui District, Project Evaluation, Shanghai: Fudan University School of Public Health, 1-66 (2006).
- [22] Y.H.Zheng, C.F.Yu, T.C.Luo; Adolescent Relationship between Gratefulness and Post-traumatic Stress Disorder Symptoms: Mediating Role of Social Support and Psychological Flexibility, Psychological Development and Education, **5**, 522-528 (2011).
- [23] X.Zhang, X.Zhao; Study on the Physique of the Liaoning Provincial Party Committee, cadres, Liaoning Sport Science and Technology, **6**, 24-26 (2005).
- [24] (a) J.Zhao; Adult Males of Weifang City Rules and Characteristics of Changes of Body Mass Index, Chinese Clinical Rehabilitation, **4**, 37-39 (2006); (b) S.L.Zheng, Y.Zheng; University Student's Psychological Evaluation System Based on Ajax Technology Design and Development, Experimental Technology and Management, **1**,1-3 (2008).
- [25] L.L.Zhang, W.D.Hu, H.Y.S, T.W; Design and Implementation of Psychological Evaluation System Based on ARM9, Development Report, **312**, 69-70 (2010).