Design of health statistics intelligent education system based on Internet +

Hongpu Hu¹, Jia Li¹, Xingyun Lei¹, Panpan Qin¹, and Quan Chen¹, a

¹ Institute of Medical Information, Chinese Academy of Medical Sciences/Peking Union Medical College, Beijing 100020, China

Corresponding author: chen.quan@imicams.ac.cn

Abstract. This Health statistics is an important basic course for medical students, and it is also an important tool for administration, public health and scientific research. Health statistics teaching plays an important role in training medical students’ scientific research thinking mode. However, due to its abstract concept, strong logic, it is difficult to understand and lack of diversified learning materials, the effect of practical application is unsatisfactory. On the other hand, being limited by the face to face teaching method, the high-quality teaching resources has not been effectively expanded and fully utilized. This paper put forward the idea of establishing intelligent education system based on Internet + health statistics, and applied new technologies such as mobile internet and artificial intelligence, auxiliary teaching APP, WeChat public number, and intelligent question bank software, to build a diversified, multi-dimensional, hierarchical and systematic health statistics knowledge system, which can benefit medical students, medical researchers with various forms of teaching resources and learning support services, promote the standardization and development of health statistics teaching, through the sharing of quality teaching resources.

1. Introduction
With the rapid development of the Internet, new technologies such as cloud computing, Internet of things, big data and artificial intelligence have been popularized rapidly, and the concept of "Internet +" has brought about a large number of applications and achievements in Internet + education, which have greatly promoted the development of education. Education emerges as the times require.

2. Concept and development of intelligent education
Intelligent education refers to the reasonable use of teaching methods and teaching strategies under the support of information technology, intelligently organizing teaching activities, student-centered, exposing students to abundant learning resources anytime and anywhere, providing teaching services, and breaking through the restrictions of classroom classes in the traditional teaching process¹,².

The concept of intelligent education was first put forward by Van Manen of Canada. It should take digital resources as the carrier to enable students to actively participate in the teaching process and form a positive interaction. In 2006, Professor Warren Simmon of Brown University proposed to establish an intelligent education system, which should be flexible, efficient and adaptive, pay full attention to educational services, and emphasize the participation of students, teachers, parents and other members. In 2008, IBM intelligent earth program pushed the research of intelligent education to a new height. With the development of intelligence education abroad, the research on intelligence
education generally emphasized the importance of knowledge sharing and resource sharing, aiming to provide more comprehensive learning support services for students [3].

The research on intelligent education in China has sprung up rapidly since 2014, including the intelligent education connotation and characteristic, development strategy, the study of the theory of the education environment, an intelligent innovation of curriculum, the practice of the intelligent platform for academic [4], emphasize the use of modern science and technology system, and reform the teaching course to people-oriented [5].

3. Significance of building education system of health statistics intelligent
Health statistics is a science that applies the principles and methods of mathematical statistics to study the health status of residents and the collection, collation and analysis of data in the field of health services. It is a basic course for medical students. The teaching of health statistics plays an important role in cultivating medical students' scientific research thinking mode and completing the researches [6].

Health statistics has the characteristics of abstract concepts, strong logic, complex calculation formulas and large amount of calculation [7]. There are also some problems in teaching, such as inconsistent explanations of statistical data types in different editions of textbooks, which lead to the difficulty of students learning health statistics. Studies have shown that quite a number of medical students have encountered obstacles in the process of health statistics learning [8]. On the other hand, with the increasing emphasis on scientific research in China, more and more medical personnel carry out or participate in scientific research. As an important tool of scientific research, health statistics has become increasingly important. According to the survey of statistical errors in the published papers of scientific researchers both at home and abroad, about 70% of the papers have statistical errors [9].

Although the importance of health statistics is beyond doubt, there are still many problems in the teaching of health statistics. For example, the existing health statistics network resources are not logically strong, lack of systematic and normative, and do not play an effective role in assisting students to learn [10]. On the other hand, health statistics teachers have accumulated a large number of excellent teaching experience in the long-term teaching, forming high-quality teaching resources, but limited by face-to-face teaching methods in teaching, these contents are mainly used in classes or colleges, not effectively promoted and fully utilized. Therefore, the teaching system of health statistics needs to be reformed urgently, and the construction of intelligent education system will be helpful to the development of education transformation. The construction of intelligent education platform focuses on open and individualized learning methods, and provides different high-quality resources, which will contribute to the transformation and development of health statistics teaching.

At the same time, the development of intelligent education platform is in line with the changing trend of teaching concept and mode in the Internet era. In the "Internet +" environment, the rapid development of knowledge and information, students acquiring knowledge is no longer confined to classroom learning, teaching concept is changing to ‘student-centered’ [11]. The traditional teaching mode can no longer meet the needs of teaching in the information age. Introducing intelligence education platform into teaching will greatly promote the transformation of teaching and learning.

4. Design of education system for intelligence of health statistics

4.1 Build a diversified, multi-dimensional, hierarchical and systematic knowledge system of health statistics
Constructing subject knowledge system is the basis of health statistics intelligent teaching and the premise of integrating all kinds of teaching resources. Knowledge system mainly includes three parts: teaching materials and courseware, learning guide and exercise.

4.1.1 Teaching materials and courseware
The main domestic health statistics textbooks and network courseware resources are sorted out, the key knowledge is summarized and refined, and the inconsistent concepts and classifications in the
textbooks are discriminated. A diversified, multi-dimensional, hierarchical and systematic knowledge system is formed. It is presented in the form of knowledge framework, detailed knowledge, knowledge map, mind map, case analysis, etc. Fig. 1 is a knowledge graphic template.

Figure 1. Knowledge diagram template.
Figure 2. Health Statistics Assisted Instruction APP System Architecture.

4.1.2 Hierarchical study guide
Based on different foundations, course objectives and requirements, learning content for students majoring in clinical medicine, epidemiology and health statistics, social medicine and health
management, the difficulty of the knowledge of health statistics is divided, and a hierarchical learning guide with clear logic, accurate and focused study guide are formed.

4.1.3 Exercise library

On the basis of the domestic excellent health statistics booklet and the compilation of test questions of well-known colleges and universities, the topics are summarized and classified, and their chapters, question types, importance levels, difficulty levels, and knowledge points are marked for building a smart problem library.

![Figure 3. Health statistics smart question bank system architecture.](image)

4.2 Functional Design of Internet-based Health Statistics Intelligent Education Platform

Wisdom education needs to rely on multi-level and integrated network learning space to establish an Internet-based health statistics intelligent education platform. The platform is mainly based on teaching resources, supplemented by the guidance of teaching and management personnel to form a diversified and three-dimensional network learning space environment to support the independent learning activities of students and researchers.

4.2.1 Smart Education Network Teaching Resources
The Health Statistics Smart Education Platform aggregates and integrates a large number of high-quality teaching resources to form online teaching resources. The teaching resources covered by the platform are mainly composed of the knowledge resource library and the problem resource library. The knowledge resource database includes video lectures on health statistics from high-quality universities, systematic knowledge of health statistics, knowledge networks, and synchronization cases. On the basis of summarizing excellent exercises, the problem resource library marks and classifies the topic metadata. The metadata includes its chapter, question type, importance level, difficulty level, test knowledge points with detailed explanation of the exercises to form a health statistics test bank that can be edited and deleted.

4.2.2 Smart Education Terminal Application System

The health statistics wisdom education platform mainly realizes the application in intelligent terminals through three forms: auxiliary teaching APP, intelligent question bank application software and WeChat public number.

4.2.2.1 Health Statistics Assistant Teaching APP

APP is mainly aimed at medical students and medical researchers and other user groups. It takes health statistics online learning, online testing, and final review as its main functions, and introduces forms such as points, medals, rankings which are popular among young people, which can enhance students' interest in learning health statistics. At the same time, the introduction of health statistics method case can be a way to answer students' confusion in theoretical study and strengthen students' practical application ability. APP client is divided into student and teacher, using modular design. The edition for student includes online learning, online testing, final review, actual case inquiry, learning community, and personal center. The edition for teacher includes four modules: online learning statistics, test results statistics, teaching case query and system management [15]. System function architecture shown in Fig. 2.

4.2.2.2 Intelligent question bank application software

The intelligent question bank is mainly for the user groups such as teachers, testers and students. It adopts modular design, including test questions configuration, question bank management, test paper management, online test, marking and user management modules [12-14], and proposes Artificial intelligence automatic test generation, intelligent automatic test papers and other methods helping to innovate teaching methods and improve teaching quality. Its system architecture is shown in Fig. 3.

4.2.2.3 WeChat public number

Health Statistics WeChat public account provides intelligent question bank website and auxiliary teaching APP portal on WeChat, and users can use intelligent question bank and auxiliary teaching APP application system through WeChat. In addition, WeChat public account will regularly push the use of smart education platform instructions, online learning contests and other activities to enhance users' interest in learning and urge them to adhere to learning behaviors.

5. Conclusion

Wisdom education is a hot issue in the current education and informatization research [16]. Based on the Internet+, this paper uses the health statistics teaching resources and wisdom education platform, and combines the network teaching mode with the traditional teaching mode to jointly build and share excellent resources. At the same time, the resource is visualized, dynamically, and intelligently displayed. Based on the construction of a diversified, multi-dimensional, hierarchical and systematic health statistics system, we specially designed the auxiliary APP, the intelligent question bank and the WeChat public number for Graduate and undergraduate students, according to the characteristics of the health statistics. Under the support of Internet technology, users can easily query the corresponding knowledge content, and can input corresponding options according to their needs. The system
automatically generates personalized knowledge content, and enhances the pertinence, interest of health statistics learning and the practical application of health statistics. Compared with the traditional teaching model of health statistics, it can reduce the duplication of labor, improve work efficiency, and share high-quality resources. It also has positive significance for improving the consistency of teaching practice activities and teaching objectives, promoting the improvement of teaching quality, promoting the dissemination of high-quality resources, and promoting the development of health statistics.

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