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Characteristics and Enlightenment of Health Informatics Education in American Universities

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ABSTRACT

The demand for health information is increasing in China, and China has gradually paid attention to health informatics education. The successful experience of American health informatics education can effectively promote the development of health informatics education in China. This paper analyzes the main characteristics of health informatics education in American colleges and universities by literature survey and network survey, and concludes that Chinese colleges and universities should strengthen practical education, enhance teachers' strength, increase the form of educational projects, and perfect the curriculum content system.

1. Introduction

In the late 1980s, American libraries began to provide health information services to the public. American colleges and universities have followed closely, vigorously promoting health informatics education[1].LIS(Library and Information Science)colleges and universities have introduced health informatics and related disciplines, such as the Master of Science Program in Biomedicine and Health Informatics at the School of Information and Library at the University of North Carolina at Chapel Hill[2]、Master of Science in Information Management Program, Wayne State University School of Information Science[3].After more than 30 years of development, health informatics education in American colleges and universities has been at the top level in the world. In recent years, with "healthy China"[4], the Chinese public began to pay more attention to their own health, and the demand for health information is also increasing. Chinese colleges and universities should take the initiative to learn from American universities, improve the level of health informatics education in China, and train excellent health informatics talents for the society. This paper analyzes the main characteristics of health informatics education in American universities through literature survey and network survey, and then draws the enlightenment to Chinese universities to carry out health informatics education.

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2 Research Methods

2.1 Literature Survey

The author uses the SCIE, SSCI database in the Web of Science as the literature source. The time span is 2015-2020, The retrieval time is September 1,2020. Search subject is ((USA OR US OR America OR United States) AND ("health informatics OR medical informatics")). Literature types are journal papers and literature reviews. Finally, the author got thirty-five papers. After removing the unrelated documents, twenty-four valid documents were obtained. Through reading the literature, the author understands the main characteristics of health informatics education in the United States.

2.2 Network Survey

The author surveyed the website of the top six health informatics professional training units in the *Best Health Librarianship and Programs* [5]. Understand the specific content of the health informatics program in these schools. See table 1.

Table 1. Health Informatics Program in American Colleges and Universities

Schools	College	School website	Course projects	Number of teachers
University of North Carolina Chapel Hill	School of Information and Library	http://sils.une.edu/	Postgraduate Certificate in Health Informatics Doctor of Health Informatics	8
University of Dressel	School of Computer and Information Metrology	http://ci.uky.edu/ci/	Master of Health Informatics	6
University of Illinois, Champaign	Intelligence Institute	http://ischool.illinois.edu/academics/degress/ms - bioinformatics	Master of Bioinformatics	3
University of Michigan Ann Arbor	Information Institute	https://si.umich.edu/	Master of Health Informatics	14
University of Pittsburgh	School of Computing and Information	http://www.sci.pitt. edu/	Bachelor of Science in Bioinformatics	3
University of Kentucky	Communication and Information Institute	http://ci.uky.edu/ci	Bachelor of Health Communication Postgraduate Certificate in Health Exchange	11

3. Characteristics of Health Informatics Education in American Universities

Combined with literature content and network survey results, the author summarizes the following four characteristics of health informatics education in American colleges and universities.

3.1 Introduction of a Joint School Model

Health informatics is an interdisciplinary subject, which combines the knowledge of nursing, medicine, computer, library and information science, which puts forward higher requirements for the teaching staff and teaching facilities. The main advantage of LIS college is that it has the information processing technology of information retrieval, information analysis, information service and so on, but it lacks the knowledge in the field of medical and health. Therefore, it is difficult to carry out the teaching and research work of health informatics only by LIS college. And through establishing good cooperative relationship with other colleges and institutions, it is an important measure to solve this problem. The survey shows that it is common for American colleges and universities to adopt the joint mode of running schools to carry out health informatics education. Based on LIS college, this model integrates multi-disciplinary teaching resources to improve teaching quality. School cooperation refers to the cooperation with other secondary colleges, and the teachers of other colleges undertake the teaching tasks of some professional courses. For example, the School of Information and Library of the University of North Carolina at Chapel Hill runs a joint school with six of its medical and computer schools[2]. Divide all compulsory courses into two modules. Module 1 courses are provided by the L IS College. The course of module two is provided by other colleges. Outside school cooperation is reflected in two aspects. The first is to employ professional and technical personnel from outside institutions as teachers to participate in teaching. Second, through the signing of contracts with government health departments, hospitals, research institutes, enterprises and other institutions to provide students with off-campus practical opportunities, such as: The University of Kentucky School of Information and Communication and Kentucky Health Department to carry out the "worth waiting" project.

3.2 Focus on Practical Education

American colleges and universities attach great importance to practical applied education. The vast majority of health informatics courses in American colleges and

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universities have a wealth of practical courses, mainly for senior students, in the form of student practice[6].Compared with theoretical courses, practical courses account for more credit, so the quality of practical courses will directly determine whether students can obtain a degree or certificate. In the form of development, American colleges and universities adopt the way of signing contracts between colleges and practice units. The types of practice units signed include government health management institutions, public medical and health institutions, medical and health related enterprises and so on. Therefore, students have a large choice space. Students can choose internship units according to their own wishes. In practice requirements, American colleges and universities have strict requirements for practice. Most colleges and universities require each student to complete at least 120 hours of practice, and very few require more than 400 hours. At the same time, the school will also equip students with corresponding practice guidance teachers to guide, supervise and manage students' practice work. Besides, LIS colleges in some colleges and universities also hold various forums and lectures to provide students majoring in health informatics with the opportunity to learn knowledge and participate in social practice, such as the "Health Literacy Series Forum" organized by the University of Kentucky School of Information and Communication ".

3.3 Diverse Teaching Programmes

Compared with domestic colleges and universities, the educational projects and forms of American colleges and universities are more diverse. American colleges and universities not only provide traditional bachelor's, master's and doctorate degree education programs, but also provide professional certificate education programs that do not grant degrees after bachelor's and master's degrees. For example, the University of Illinois at Chicago has established a bachelor's degree in health informatics, master's degree and post-master's certificate education. For students who complete the course and pass the examination, only the corresponding professional certificate, not the degree. Unlike China, the United States also has a high degree of recognition for professional certificate education. In addition, online education is also one of the important forms of education in American colleges and universities. Some colleges and universities provide students with online training programs for health informatics education. such as: University of Dressel, Kent State University, etc. The emergence of online education enables students to choose their own curriculum items flexibly according to their own conditions.

3.4 Design of An Advanced Curriculum Content System

The content system of health informatics education curriculum in American colleges and universities is mainly reflected in the following two aspects. First, the school will design different curriculum content according to different talent training objectives. For example, the School of Applied Health Sciences at the University of Illinois at Chicago also offers a Bachelor of Health Information Management and a PhD in Biomedical and Health Informatics. The goal of bachelor's training is to train students to become health information administrators. The content of the course is mainly the basic knowledge and skills of medicine, computer and other subjects. The goal of doctor training is to train high-level scientific research scholars in the field of health management. The main content of the course is the study of advanced research methods, the transformation and application of research results. Second, the school will combine the school's superior discipline innovation curriculum content system. For example, the School of Computing and Information of the University of Pittsburgh integrates the dominant subject of computer science into the course, offering courses such as "biomedicine" and "biostatistics" and so on.

4. Revelation to the Construction of Health Informatics Education in Chinese Universities

4.1 Strengthening Practical Education

Compared with American universities, Chinese universities pay less attention to practice. Health informatics education in Chinese colleges and universities generally emphasizes theory and practice. Although most Chinese colleges and universities have set up practical courses, there are few practice units, short practice time and loose practice management. Therefore, Chinese colleges and universities should attach importance to and strengthen practical education. The details are as follows: (1) strengthen cooperation. Schools should strengthen cooperation with government, hospitals, research institutes, enterprises and other institutions to promote the joint mode of running schools. By increasing the type and number of practice units available to students, students can choose suitable practice units according to their own research direction, combine theory with practice, and improve their practical working ability. (2) Improve the practice management system. The school should perfect the existing practice management system, put forward the practice

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request and the examination standard clearly, increase the practice time, at the same time provide the practice instruction teacher for the student, help the student to obtain more professional knowledge in the practice process.

4.2 Promotion of Teachers

Health informatics is a cross-disciplinary subject, and teachers have an important influence on health informatics education in schools. Compared with American universities, Chinese colleges and universities have relatively weak teachers, so Chinese universities can try to improve their teachers in the following ways. (1) Strengthening cooperation with outside institutions. Employ professional and technical personnel from other colleges or outside the school as external teachers to assist in the teaching of some professional courses in health informatics. (2) Training of our talents. Schools can encourage teachers to actively carry out scientific research work or go out to exchange and study by setting up special funds and scientific research awards, so as to enhance their teaching and scientific research ability. (3) Introduction of talents outside school. Schools can cooperate with local governments to set up special talent introduction projects to provide housing, children's school, scientific research funds and other supporting services for outstanding talents, so as to attract professional and technical personnel outside the school.

4.3 Increase in the Form of Educational Projects

American colleges and universities LIS colleges have set up a variety of health informatics education projects. Compared with the United States, the educational projects carried out by Chinese colleges and universities have the following two problems. First, only a small number of LIS colleges in China have set up health informatics education projects. Second, Chinese colleges and universities only set up offline full-time degree education and health informatics part of the skills training program. Therefore, Chinese colleges and universities should increase the form of health informatics education according to their own situation. Specifically, (1) carry out online education projects. Online education has a strong convenience, but there are also some drawbacks, such as: students may cheat in online exams. Therefore, colleges and universities can carry out online education projects by combining online teaching with offline examinations. (2) Carry out uniform professional certificate education. At present, some colleges and universities have carried out health informatics related training, but the social recognition of training certificate is low. Therefore, colleges and universities can learn from the experience of American universities and try to jointly carry out unified health informatics professional certificate education in many colleges and universities, which can not only help students acquire professional knowledge and skills. At the same time, it also helps to improve the social recognition of professional certificate education.

4.4 Innovative Curriculum Content System Design

The content system of health informatics course designed by American colleges and universities is forward-looking. Compared with American universities, the content of health informatics course in Chinese universities is relatively single. Chinese colleges and universities can perfect the design of curriculum content system from the following two aspects. On the one hand, because of the different national conditions of China and the United States, Chinese colleges and universities cannot directly copy the curriculum content of American colleges and universities. Therefore, Chinese colleges and universities can fully investigate the employment market of health informatics graduates in China by means of questionnaires and interviews, and fully understand the needs of government, hospitals and enterprises for health informatics graduates. Design the course content scientifically according to the research results. On the other hand, Chinese colleges and universities can also combine their own advantages of health informatics courses. For example, medical colleges and universities can integrate more clinical medicine, nursing and other medical related courses in the course of health informatics to help students master more abundant medical knowledge.

5. Conclusion

Through literature survey and network survey, the main characteristics of health informatics education in American colleges and universities are as follows: adopting joint mode of running a school, paying attention to practical education, carrying out various teaching projects and designing advanced curriculum content system. At the same time, the enlightenment of health informatics education in Chinese colleges and universities is obtained, which are: strengthening practical education, improving teachers' strength, increasing the form of educational projects, and innovating the design of curriculum content system. Under the background of "healthy China ", health informatics education in Chinese colleges and universities began to develop gradually. Although the development process is very slow, Chinese colleges and universities should con-

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tinue to strive to train more excellent health informatics talents for China.

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