



Research on the Sharing and Application of TCM Digital Resources

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Abstract. With the vigorous development of online teaching and online learning, it has further increased the demand for digital resources, and further enhanced the feasibility of digital education, the necessity of digital resource construction and the importance of digital resource sharing in the information age. In this study, the status quo of TCM digital resources was studied from the aspects of literature research and resource construction, and a questionnaire survey was conducted among teachers and students in the major of TCM acupuncture in a TCM university. On this basis, suggestions on the application of digital resources in TCM acupuncture courses were proposed.

Keywords: Traditional Chinese Medicine · Digitalization · Learning resource · Resource sharing · Resource application

1 Introduction

Under the background of educational informatization, students' learning needs and learning styles have changed significantly, and the advantages of digital learning resources are fully reflected in the learning process. This new learning mode based on advanced educational technology can effectively promote the reform of teaching content presentation mode, teachers' teaching mode and students' learning mode, which not only puts forward higher requirements for teachers' personal quality, but also puts forward new challenges to learning resources. In October 2015, the Chinese medicine industry education cloud platform was officially launched, and the digitalization process of Chinese medicine industry education officially began.

Domestic scholars began to study teaching resource database in the early 21st century. In the past ten years, very important research achievements have been made. From the initial theoretical research to the application of various new theories and technologies at home and abroad to the construction of educational resources in recent years, relevant departments of the state have organized the nationwide development of digital resources in the form of engineering projects and built various national resource databases at all levels. Governments at all levels and schools of various types have also built a number of resource libraries of different sizes. At present, the well-known digital resource

construction platforms for medical science in China include: national excellent course resource network, Tsinghua University online school, medical vision world medical resource database, human health medical network, etc.

The research on digital learning resources in foreign countries is relatively early, especially in United States, Britain, Germany, France, Japan and other countries. The emphasis of digital teaching research in e-learning environment abroad is theory and technology. In Britain, United States and other western countries, the construction of learning resources has formed a set of very strict standards for resource development and related modes for implementation and management. Among these successful models, the representative resource portals in foreign countries mainly include: GEM project in United States, EdNA in Australia and CANCORE in Canada [1].

The implementation of national quality engineering represented by high-quality curriculum plays a significant role in promoting the construction of high-quality teaching resources, but the quality resources recognized by teachers and students in the practice process are still scarce. Experts and scholars are actively exploring the construction of digital resources, and TCM ancient books resources have been effectively developed [2-4]. Although China has always attached great importance to the construction of high-quality teaching resources, due to the lagging development of education and the complexity of the educational environment, the construction and application of high-quality teaching resources are still not optimistic. In particular, the systematic research and development of digital learning resources related to traditional Chinese medicine is less, and they are still in the stage of learning and absorbing achievements. How to construct high-quality digital teaching resources, network platform and high-quality digital education resources in the information technology environment is a problem to be further studied.

In the construction and application of digital resources, resource construction is the foundation and guarantee, resource application is the ultimate goal, and resource construction should serve resource application, which in turn promotes resource construction. As an indispensable element in the process of digitization of education, the construction and application of digitization resources are paid more and more attention. Digitalization of TCM can be realized to improve resource utilization and provide services for TCM teaching, scientific research and clinical application [5]. In order to better meet the learning and teaching needs of students major in traditional Chinese medicine, it is necessary to build high-quality digital educational resources for traditional Chinese medicine, constantly promote the co-construction and sharing of digital resource network platform, and gradually realize the network and digitalization of teaching and learning.

2 Analysis on the Current Situation of TCM Digital Resources

The analysis of the current situation of digital resources of traditional Chinese medicine is mainly carried out from two aspects: first, analyze the development and changes of literature research in recent years from literatures related to digital learning resources of traditional Chinese medicine, and the second, analyze the digital resources of TCM in each network resource platform.

2.1 Literatures Research Status

Database Selection

The databases selected for this study are CNKI, WANFANG DATA, and Chongqing VIP database.

Literatures Selection Criteria

The selection of paper follows the following criteria:

- 1) Papers should be published and be income to the academic papers database.
- 2) Papers retrieval periodicals should be limited to education, medical science and technology journals.
- 3) Papers should be published between January 2009 and August 2020.
- 4) When paper retrieval is carried out, “subject” is the limiting constraints.

Results and Analysis

The results retrieved from each database are shown in Fig. 1.

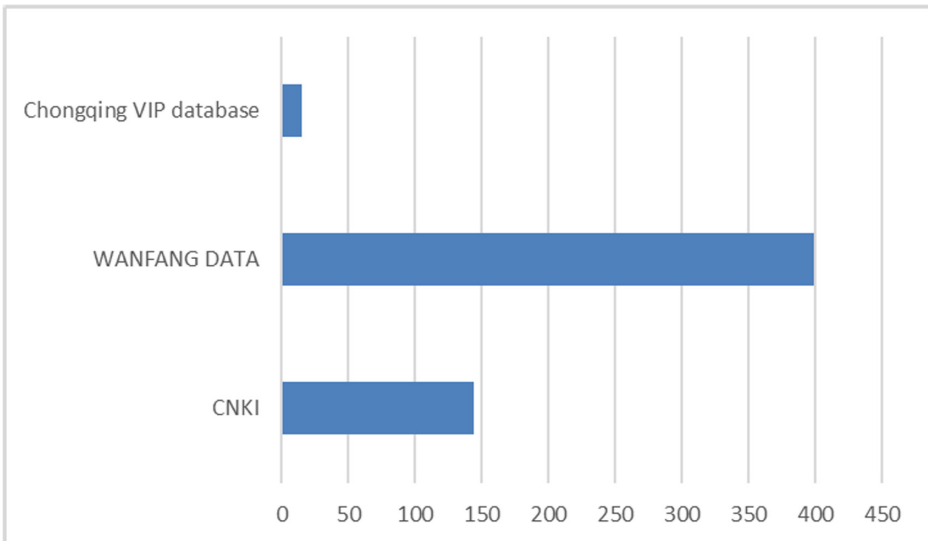


Fig. 1. Retrieval results.

Relevant retrieval indexes were set on CNKI and retrieved with the themes of “Traditional Chinese medicine digital resources” and the theme of “Traditional Chinese medicine Network platform construction” respectively. By August 2020, a total of 144 relevant literatures had been retrieved.

Relevant retrieval indexes were set on WANFANG DATA and retrieved with the themes of “Traditional Chinese medicine digital resources” and the theme of “Traditional Chinese medicine Network platform construction” respectively. By August 2020, a total of 399 relevant literatures had been retrieved.

Relevant retrieval indexes were set on Chongqing VIP database and retrieved with the themes of “Traditional Chinese medicine digital resources” and the theme of “Traditional Chinese medicine Network platform construction” respectively. By August 2020, a total of 15 relevant literatures had been retrieved.

Among the retrieved literatures, the literature with low relevance, such as advertisements, conferences, contribution invited and news, as well as repeated literatures were eliminated by manual screening, and finally 295 literatures related to digital resources of traditional Chinese medicine were selected.

Through the preliminary analysis of the literature content, in the era of rapid development of digital network, the development trend of TCM universities is to strengthen the construction of digital resources while maintaining the characteristics of TCM specialty. In addition, through the network resource platform, realizing the resource sharing and application can accelerate the construction of digital resources and create a digital resource construction road with the characteristics of traditional Chinese medicine.

2.2 Current Situation of Resource Construction

Excellent Courses

There are 23 traditional Chinese medicine universities in China, and each university had built a website of excellent courses. The constructions of excellent courses in each universities are shown in Table 1. Some universities cannot open the network of excellent courses normally, or we cannot obtain the data of excellent courses through other ways, so it is marked as “-” in Table 1. Due to the fact that some universities have not updated their websites of excellent courses in time, the statistical data cannot be guaranteed to be completely accurate, but it can also reflect the general situation of the construction of excellent courses in traditional Chinese medicine universities.

In addition to excellent courses, Beijing University of Chinese Medicine, Guangzhou University of Chinese Medicine, Fujian University of Traditional Chinese Medicine and Jiangxi University of Traditional Chinese Medicine have set up national bilingual teaching model courses. Zhejiang Chinese Medical University and Hubei University of Chinese Medicine have also set up resource-sharing courses, high-quality postgraduate courses and other curriculum resources.

Open Resource Platform

Influenced by foreign open courses and drawing lessons from the essence of online open course teaching mode, the national excellent course construction project came to an end. In 2011, the Ministry of Education launched the second round of undergraduate teaching project -- national excellent open course construction, including excellent video open

Table 1. The construction of excellent courses in universities of Chinese medicine.

No	Universities	National Excellent Courses	Provincial and Municipal Excellent Courses	University-level Excellent courses
1	Beijing University of Chinese Medicine	6	11	41
2	Guangzhou University of Chinese Medicine	3	–	–
3	Shanghai University of Traditional Chinese Medicine	7	17	17
4	Nanjing University of Chinese Medicine	6	–	23
5	Chengdu University of TCM	5	27	31
6	Shandong University of Traditional Chinese Medicine	7	33	–
7	Heilongjiang University of Chinese Medicine	8	22	52
8	Tianjin University of Traditional Chinese Medicine	6	10	–
9	Hunan University of Chinese Medicine	1	8	12
10	Liaoning University of Traditional Chinese Medicine	3	24	–
11	Hubei University of Chinese Medicine	1	11	–
12	Zhejiang Chinese Medical University	4	25	–
13	Changchun University of Chinese Medicine	3	23	–
14	Fujian University of Traditional Chinese Medicine	3	26	–

(continued)

Table 1. (continued)

No	Universities	National Excellent Courses	Provincial and Municipal Excellent Courses	University-level Excellent courses
15	Jiangxi University of Traditional Chinese Medicine	2	4	1
16	Henan University of Chinese Medicine	–	17	–
17	Shaanxi University of Chinese Medicine	–	20	20
18	Yunnan University of Chinese Medicine	–	17	–
19	Guangxi University of Chinese Medicine	–	14	–
20	Anhui University of Chinese Medicine	1	18	22
21	Gansu University of Chinese Medicine	–	9	39
22	Guizhou University of Traditional Chinese Medicine	–	13	–
23	Shanxi University of Chinese Medicine	–	11	–

course and excellent resource sharing course [6, 7]. In this study, statistics on TCM related resources in open resource platforms were conducted, and the results are shown in Table 2.

Table 2. The number of TCM resources in each open resource platform.

No	Website	The number of TCM resources
1	https://open.163.com	18
2	https://www.icourses.cn/	149
3	https://www.xuetangx.com/	97
4	https://www.coursera.org/	14
5	https://www.edx.org/	8
6	https://www.cnmooc.org/home/index.mooc	62

Results and Analysis

As can be seen from Table 1 and Table 2, the number of digital resources related to TCM is not large. In domestic 23 excellent course websites of university of Chinese medicine, there are national excellent courses, including pharmaceutical, traditional Chinese medicine, nursing, basic medical, clinical medicine, such as Basic Theory of TCM by Xiazhen Guo from Beijing University of Chinese Medicine, Internal Medicine of TCM by Chunguang Xie from Chengdu University of TCM, Nursing of Chinese Medicine by QiuHua Sun from Zhejiang Chinese Medical University, and Authentication of Chinese Medicines by Dekang Wu from Nanjing University of Chinese Medicine, etc.

As can be seen from Table 1, a small number of excellent courses are not updated in time, or the course resources website cannot be opened, or there is no open course resources. All these are detrimental to the construction, sharing and application of digital resources in TCM universities.

As can be seen from Table 2, among the open resource platforms, the number of TCM related open and shared resources is not large and the construction is insufficient. Students can use the resources in various open resource platforms for online learning at anytime and anywhere, free from time and space restrictions, and make full use of the fragmented time for learning. Therefore, TCM universities should actively build excellent open and share courses, give full play to the advantages of high-quality teaching resources, and improve the utilization rate of excellent teaching resources.

Different TCM universities have the same excellent courses, but also have different excellent courses. Even if it is the same excellent course, because of the different teaching style, teaching method and teaching means, students will have different experience and feelings while learning. Therefore, excellent courses of TCM universities can realize inter-school openness, exchange and sharing, enrich the quantity of excellent teaching resources of each university, make up for the shortage of excellent teaching resources, and encourage teachers and students to make full use of these excellent teaching resources for teaching and learning.

Combined with traditional Chinese medicine, by promoting the construction of digital resources and network platform, it can provide better and more practical digital learning resources to assist students' learning. It is a development trend in the future. With the passage of time and the development of information networks, more and more digital resources of different forms will be generated among Chinese medicine universities, and digital resources will be shared among them. If we make full use of excellent learning resources, we can improve the level of education and teaching, and then promote students' learning.

3 Application of Traditional Chinese Medicine Digital Learning Resources

To investigate the application of digital resources and the students' use of digital resources in the learning process, this study conducted a questionnaire survey for teachers and students major in acupuncture and moxibustion from a university of traditional Chinese medicine.

3.1 Questionnaire Design

Teachers should combine information technology, educational theory and subject curriculum together, and then combine their own teaching practice to achieve the purpose of teaching innovation and optimization [8]. To solve this problem, this study designed a questionnaire about teachers' use of information technology in teaching. In order to understand students' demand for digital teaching resources in the learning process, this study designed a questionnaire on the application of digital teaching resources.

3.2 Respondents

The respondents are divided into two categories: one is teachers from College of Acupuncture and Orthopedics in a University of Chinese Medical, and the other is students from the class of acupuncture and massage (Acupotomy) of 2018 in the same university.

3.3 Results and Analysis

Analysis of Results of the Information Technology Use Questionnaire (teacher)

A total of 10 questionnaires were distributed to teachers from college of Acupuncture and Orthopedics in a University of Traditional Chinese Medicine. Ten questionnaires were collected in this questionnaire survey, and the recovery rate was 100%. Among them, there were 10 valid questionnaires, and the questionnaire effectiveness was 100%.

Results analysis:

- 1) On the application of computer ability, for computer proficiency, 70% of respondents were more skilled, 30% of the respondents had average proficiency.
- 2) For information teaching ability, 70% of respondents did not deliberately use network resources, and 30% actively used network resources.

The results showed that it is feasible for teachers to use digital quality teaching resources in teaching.

Analysis of Results of the Digital Resource Application Questionnaire (students)

A total of 60 questionnaires were distributed to undergraduates from the class of acupuncture and massage (Acupotomy) in 2018 in a university of Traditional Chinese Medicine. A total of 60 questionnaires were collected and the questionnaire recovery rate was 100%. Among them, there were 60 valid questionnaires and the questionnaire effectiveness was 100%.

Results analysis:

- 1) When applying digital learning resources, the proportion of respondents choosing text, image, animation, audio and video was respectively 20%, 13%, 15%, 12%, 40%, and the proportion of respondents choosing media materials, questions and papers, courseware and cases, online courses, others was respectively 35%, 13%, 28%, 18%, 6%.

- 2) Theory class, the students thought video tutorials (34%), courseware (16%), knowledge map (26%) and reference books (16%) were helpful.
- 3) Practice class, three effective resources were video tutorials (36%), experiment guidebook (18%), animation or image resources (30%).
- 4) In question feedback, the main problems were: too many resources and not enough time to study (33%), lack of organization in resource integration (27%), and lack of guidelines for effective resource use (24%).

The results showed that students were more inclined to use video resources, text resources, media materials and courseware cases when using digital resources. Through the rational and effective application of digital resources, students will take the initiative to accept and show greater interest in learning, and change from passive learning to active learning.

3.4 Suggestions

Acupuncture and moxibustion as a traditional Chinese medical means, combines theory with practice, has its special nature and charm. Usually, the knowledge of acupuncture and moxibustion of TCM is taught through traditional teaching methods. In order to truly optimize the application effect of digital resources and improve the quality of digital teaching and learning, corresponding countermeasures should be taken [9].

Application of Digital Resources in Different Types of Courses

Application of Digital Resources in the Theoretical Basis of TCM Acupuncture and Moxibustion

Acupuncture and moxibustion is a course combining theory with practical operation. Theoretical knowledge in the early stage is difficult to understand, and practical operation is still needed in the later stage. For such a class of courses, the application of digital resources such as video, pictures and websites will be the key to solve the teaching problem. In the theoretical teaching of acupuncture and moxibustion in traditional Chinese medicine, the introduction of meridians and acupoints in the early stage is quite critical. It is not only necessary for students to clearly understand the composition and distribution of meridians, the location and function of acupoints, but also the location and circulation of fourteen meridians. These meridians and acupoints are relatively conceptual things, which cannot simply be explained clearly through words. Therefore, adding appropriate digital resources in the classroom will greatly improve the teaching quality.

Application of Digital Resources in Clinical Operation of TCM Acupuncture and Moxibustion

The application of digital resources in teaching enriches the teaching content to a large extent. For acupuncture and moxibustion major, which is highly operational and highly skilled, the traditional teaching methods imitated by students can no longer satisfy students' knowledge cognition only by teachers' on-site practice in class, leading to low teaching efficiency and effectiveness. If we make full use of network resources, multimedia technology, dynamic teaching AIDS and other modern teaching tools and means, we can impart more knowledge to students [10]. As a part of the clinical practice of

acupuncture and moxibustion, the former teaching mode is more about teachers practicing on the spot in the operation class and students following to strengthen the mastery of acupuncture and moxibustion skills. However, in order to further improve the teaching quality, we can add high-quality learning videos and high-quality teaching videos of acupuncture and moxibustion masters to the actual teaching process of acupuncture and moxibustion, so as to deepen the understanding and mastery of acupuncture and moxibustion skills. In this way, the application of high-quality digital teaching resources in traditional acupuncture and moxibustion teaching can greatly enhance learning, improve teaching quality and enrich teaching content.

Application of Digital Resources in Different Types of Teaching Content

Use Digital Resources in the Form of Thematic Projects

Through the understanding of the curriculum system of acupuncture and moxibustion, the learning knowledge can be divided into several sections, which are meridians, acupoints, acupuncture, and treatment. Through the teachers' understanding of several parts, it will be an effective way to strengthen the teaching quality to select the corresponding digital teaching resources in the teaching process, form the corresponding thematic learning mode, and display and absorb the knowledge in a precise, familiar, structured and systematic way.

The content of each project can be realized in the form of courseware, documents, pictures, videos, animations and other resources, which can greatly satisfy students' learning content and interest. Taking a thematic teaching as an example, the thorn moxibustion theory introduction (courseware and document), acupuncture point acquaintance (the human body acupuncture point diagram - picture), thorn moxibustion methods guidance (real acupuncture find video - video), such series of knowledge on collocation of thorn moxibustion series of high-quality digital resources, on the one hand, reduce teachers' burden, on the one hand, improve students' interest.

Applying Digital Resources in Task-Driven Form

Task-driven teaching and learning can provide students with situations of experiencing practice and perceiving problems, learning around tasks, testing and summarizing learning process by task completion results, etc., so as to change students' learning status and enable them to actively construct a learning system of exploring, practicing, thinking, applying and solving high wisdom.

- 1) Create a situation: Create a learning situation that is relevant to the current learning topic and as real as possible, and guide learners to enter the learning situation with real tasks. Aiming at the study of the theoretical operation of acupuncture and moxibustion, an acupuncture and moxibustion practice class is set up here, and a video of acupuncture and moxibustion (national excellent course) is selected.
- 2) Identify the problem: In the situation, select the real problems related to the current learning topic as the central content of learning, so that students need to be faced with a real problem that needs to be solved immediately. According to the video teaching, the teacher puts forward a series of operational problems, such as "How to fix acupoints? To what extent?"
- 3) Independent learning: Instead of telling students how to solve problems directly, students should collect problem-solving methods from the high-quality teaching

resources provided by teachers, so as to achieve the goal of self-directed learning. At the same time, students are encouraged to discuss and communicate with each other.

- 4) Effect evaluation: The evaluation of learning effect mainly includes two aspects: the first is the process and outcome evaluation of whether the student solves the problems, and the second is the evaluation of the student's independent learning ability. For example, whether the student has found the corresponding acupoint, and whether the student can complete acupuncture at a certain acupoint.

The application of digital resources has its convenience and flexibility, but there are also some shortcomings, which need to give full play to its essence when using. With the reform of traditional Chinese medicine teaching, the traditional teaching mode is changing, and information-based teaching methods, teaching tools and teaching means have been integrated into it. Under the background of education informatization, it is necessary to make full use of various tools and digital resources and apply them efficiently in the teaching classroom.

4 Conclusion

Through the research on the current situation of traditional Chinese medicine digital teaching resources, the progress of digital teaching is understood, and the necessity of digital education in the information age and the importance of digital resource construction are understood more clearly. Taking acupuncture and moxibustion for example, this study suggested that the use of digital resources in classroom teaching should be focused, concise and clear, and as much as possible to add some students easy to accept and understand the way of resource expression to highlight the intuitive teaching content, stimulate students' interest in learning, promote students' understanding of the teaching content, students' positive thinking.

The construction, sharing and application of TCM digital resources is a complex problem, and there are still some imperfections in this study, which need to be further studied.

- 1) In terms of the construction of digital teaching resources, in the context of China's vigorous development of "Internet + Traditional Chinese Medicine" and emphasis on "collect crowd funding, gather crowd strength", it is possible to make full use of the advantages of information technology, give full play to the initiative and creativity of network groups, and introduce public wisdom into the construction and sharing of traditional Chinese medicine digital resources.
- 2) In terms of the application of digital teaching resources, this study only proposes some Suggestions on the application of digital teaching resources in acupuncture and moxibustion, and the application strategies and effects need to be further studied.

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References

1. Chen, W., Luo, C.Y., Wang, Y.X., Qin, W., Yuan, Z.Y.: The construction and application of digital teaching resources of Formulaology. *Modern Traditional Chinese Med.* **5**(35), 204–206 (2015)
2. Xiong, F., Song, G.Q.: Investigation on the construction status of digital resources of ancient Chinese medicine books in universities. *Inner Mongolia Sci. Technol. Econ.* **15**, 97–99 (2020)
3. Jiang, Y.J., Li, X., Sun, L., Guo, L.: Construction of digital resource platform for ancient ancient doctors and their medical books in Jingchu. *China J. Traditional Chinese Med. Pharmacy* **34**(8), 3808–3810 (2019)
4. Zhou, J.Y., Yang, P., Wang, S.W.: Current situation of digitization construction of TCM information resources in China. *Chinese J. Med. Libr. Inf. Sci.* **25**(7), 49–52 (2016)
5. Cao, H.Z.: On the digitization construction of TCM resources. *Chinese Med. Modern Distance Educ. China* **4**(10), 49–50 (2006)
6. Liu, K.N.: From the construction of excellent courses to the construction of high-quality open courses – the exploration of Chinese Mooc. *Sci. Technol.* **27**(007), 344 (2017)
7. Shen, L.Y., Zhao, A.J., Dong, R.: From national quality curriculum to the national quality open video class open education movement in China has entered a new period. *Modern Educ. Technol.* **22**(11), 62–67 (2012)
8. Zhao, Y.R., Han, P.L., Xiang, T.C.: Application status and Analysis of digital teaching resources in college teaching. *Guangzhou Chemical Industry* **39**(2), 144–146 (2011)
9. Yu, Q.C.: Research on the Strategies of classroom Teaching application of digital teaching resources in universities. *Educ. Teach. Forum* **43**, 73–75 (2013)
10. Ma, F.Y.: Primary exploration in figure teaching of ophthalmology of TCM. *Guiding J. Traditional Chinese Med. Pharmacy* **12**(1), 88–89 (2006)