

Innovation and Practice of “Four-in-One” Medical Talent Training Mode Driven by “Wisdom, Integration and Characteristics”

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Abstract

Purpose: To build a “Four-in-one” medical talent training mode driven by “Wisdom, Integration and Characteristics” in ethnic minority areas to improve students’ humanistic accomplishment, practical and innovative ability and post competence and train high-quality characteristic application-oriented medical talents. **Solutions:** The “Four-in-one” medical talent training mode driven by “Wisdom, Integration and Characteristics” is created and applied to the medical talent training practice of our school by taking the educational informationization as the endogenous variable of systematic reform of education, and “integration of science and education, integration of production and education, integration of theory and practice” as the focus to improve the quality of medical talent training, focusing on the four elements of “knowledge imparting, ability development, career skill development and value shaping” in talent training, combining the functions of “scientific research, social service, cultural inheritance and innovation” of colleges and universities, and launching the reform from the aspects of “thick foundation, strong ability, pro-industry, and humanities (Four-in-one)”. **Results:** The students’ humanistic accomplishment, practical ability, innovation and entrepreneurship ability and post competence have been significantly improved; the level and gradation of running school have been greatly enhanced. **Conclusion:** The construction of “Four-in-one” medical talent training mode driven by “Wisdom, Integration and Characteristics” in ethnic minority areas can help improve the training quality of medical talents.

Keywords

Wisdom Education, Integration of Science and Education, Integration of Production and Education, Integration of Theory and Practice, Four-in-One Training Mode

1. Introduction

The implement of “Healthy China Strategy” needs to promote the development of the pharmaceutical industry. Guangxi presides over building the international innovation cooperation of traditional Chinese medicine industry between Guangxi-Hong Kong-Macao and ASEAN in the context of “the Belt and Road Initiative”, and Pharmaceutical Science is one of 14 industry clusters on a scale hitting 100 billion yuan constructed by Guangxi, which needs a large number of high-level medical talents. In 2020, the State Council approved the establishment of Key Development and Opening-up Experimental Zone in Baise, which has clearly defined the strategic orientation and development goals of revitalization of the old revolutionary base areas in the next 10 years, and the development of ethnic medicine and health industry has been one of the important parts.

There are more than 4600 kinds of Chinese herbal medicine in Guangxi, ranking the second in the country, while nearly 2000 kinds in Baise City, ranking the first in Guangxi, with outstanding advantages of ethnic medicine. However, the level of medicine innovation and development lags far behind that of developed areas, which is caused by the lack of professional medical talents and understanding of regional characteristic medicine resources. Therefore, the training of high-quality application-oriented medical talents bears a great strategic significance to meet the needs of regional development. In order to improve the quality of talent training, the Ministry of Education proposes to lead the educational modernization with the support of educational informatization, and makes efforts to promote the integration of information technology and education (Yang, Wu, & Zheng, 2018); the Ministry of Education also puts forward that “integration of science and education, integration of production and education, and integration of theory and practice” is the focus to improve the quality of medical talent training in universities and colleges. In addition, as a university in ethnic minority areas, we should “give full play of advantages and drive innovative development” for the training of characteristic application-oriented talents with research and development capabilities of Zhuang and Yao ethnic medicine. Therefore, it is a strategic choice for the reform and development of higher education in the new era to explore new ways of promoting talent training by wisdom education and “integration of science and education, integration of production and education, and integration of theory and practice (three integrations)”. Since 2012, we have successfully established the “Four-in-one” medical talent training mode driven by “Wisdom, Integration and Characteristics” after years of research and practice.

2. Summarization of System

In order to improve the quality of talent training, the Ministry of Education proposes to lead the educational modernization with the support of educational informatization, and makes efforts to promote the integration of information technology and education; in addition, the Ministry of Education also puts forward that “three integrations” is the focus to improve the quality of medical talent training in universities and colleges. Therefore, it is a strategic choice for the reform and development of higher education in the new era to explore the new ways of promoting talent training by wisdom education and “three integrations”.

Since 2012, with the continuous support of Guangxi Higher Education Teaching Reform Project and other projects, this project has successfully established the “Four-in-one” medical talent training mode driven by “Wisdom, Integration and Characteristics” after years of research and practice, aiming at the training of high-quality application-oriented medical talents with masterly skills and absolute sincerity, taking the opportunity of the integration of characteristic majors and experimental training teaching bases in universities and colleges, focusing on the four elements of “knowledge imparting, ability development, career skill development and value shaping” in talent training, and launching the reform from the aspects of “thick foundation, strong ability, pro-industry, and humanities (Four-in-one)”. Wisdom drive takes the educational informatization as the endogenous variable of systematic reform of education, and forms a new way for education informatization to lead the “wisdom professional education”. Integration drive takes “integration of science and education, integration of production and education, and integration of theory and practice (three integrations)” as the focus to improve the quality of medical talent training. For promoting the “integration of science and education” of talent training, this project demonstrates the scientific research feedback as the teaching highlight, and regards students’ participation in scientific research as an effective form of “practical ability education”. For promoting the “integration of production and education” and deep cooperation between universities and enterprises of talent training, this project establishes the application-oriented undergraduate major of the integration of production and education in Science of Chinese Pharmacology to realize the “school-enterprise collaborative education”. For promoting the “integration of theory and practice” of talent training and innovating teaching methods, the project-based teaching and heuristic teaching methods are used in this project such as PAD Class and flipped classroom, which ensures the close combination of theoretical and practical teaching; This project also focuses on the development of “integration of theory and practice” ideological and political and excellent traditional cultural case resources in professional curriculum education, and the enhancement of students’ “medical humanitic education” by combining theory with professional practice. Characteristic drive refers to “giving full play of advantages and driving innovative development” to provide excellent reserve forces for the economic development of local characteristic medi-

cine, relying on research directions with regional characteristics such as key disciplines and key laboratories in National Administration of Traditional Chinese Medicine, and cultivating characteristic application-oriented talents with research and development capabilities of Zhuang and Yao ethnic medicine.

3. Problems in Medical Talent Training in Ethnic Minority Areas

1) The traditional training mode of medical talents emphasizes theory, knowledge and specialty but underestimates practice, innovation and accomplishment. Medical colleges still follow the traditional mode in medical talent training, and aim to training theoretical talents with solid professional basic knowledge. The curriculum system and teaching content are not suitable for the training of students' post competence with some deficiencies in the training of students' practical skill, innovative ability and humanistic accomplishment (Chen, Shi, Li, & Yan, 2020). The "Four-in-one" mode of this project changes the traditional talent training focusing on the single process of "presentation" to realize the coordination with "knowledge imparting, ability development, career skill development and value shaping", highlight the cultivation of students' practical ability and innovative ability, build a provincial first-class undergraduate social practice system, and promote the coordinated development of professional education and innovation and entrepreneurship education. 2) The talent training does not match the social needs with the single main structure of the traditional talent training mode (Guo, Zhou, & Liao, 2021). This project changes the single school body of talent training and establishes the application-oriented undergraduate major of the integration of production and education in Science of Chinese Pharmacology, realizing the multi-subject collaborative education of the integration of production and education, school-enterprise cooperation and school-school combination, and truly solving the disconnection between universities and social needs. 3) To cope with the situation that traditional Chinese medicine culture is being forgotten and abandoned (Guan, Chen, & Gao, 2020), this project promotes the integration of curriculum ideological and political education and traditional Chinese medicine culture, builds a humanistic education system of "integration of theory and practice, wisdom guidance and characteristics of traditional Chinese medicine", and focuses on cultivating talents who are firmly confident in traditional Chinese medicine culture.

4. Reform Measures of Medical Talent Training Mode

4.1. Build a New Concept of Talent Training Driven by "Wisdom, Integration, and Characteristics"

With "wisdom, integration, and characteristics" as the starting point, with "thick foundation, strong ability, pro-industry, and humanities" application-oriented talents as the training goal, explore the transformation of the curriculum system oriented from subject needs to social needs, and promote the "Teaching" is transformed into a "learning"-centered teaching model, and the transformation

of a training program centered on academic performance to industry needs is implemented, and the “single school subject, professors and doctors focusing on research and teaching” to “school-enterprise multiple subjects, high-level”. Teachers and scientific research resources are in-depth teaching quality assurance system is transformed, and a new way of “three holistic education” is constructed.

4.2. Build a “Thick Foundation” Training Method Driven by “Wisdom, Fusion of Theory and Reality”

The information technology is used in this project to cultivate students’ interest in independent learning based on the network, enhance their ability to use network resources for learning, motivate teachers to change teaching concepts with network and improve their teaching ability with information technology. 1) The virtual simulation teaching platforms have been built such as virtual pharmacy and GMP pharmaceutical preparation simulation training. The teaching platforms help realize online and offline, mobile learning such as Duifene, Rain Classroom and Moso Teach. Combined with the new teaching mode of “integration of theory and practice” such as flipped classroom and PAD Class, the “student-centered” teaching mode is achieved to improve students’ independent learning and innovative thinking ability. 2) The big data can be mined systematically with teaching platforms such as Duifene, Moso Teach and Rain Classroom, which solves the bottleneck of lack of formative evaluation evidence (Liao, Li, Huang, Li, Huang, Huang, & Tang, 2020), establishing an assessment mode combining formative evaluation and final assessment, paying attention to improving teachers’ teaching ability, and promoting the improvement of teaching and learning and talent training quality. 3) The construction of teaching materials takes the initiative in meeting the practical needs of the deep integration of information technology and education and teaching. The concept of “Internet + Education” is incorporated into the teaching materials compiled in this project, and the organic integration of paper resources and digital teaching materials facilitates students’ mobile learning at any moment, and creates curriculum teaching materials with interactive characteristics to support the talent training system.

4.3. Build a “Strong Ability” Training Method Driven by “Science and Education Integration, Characteristics”

To cope with the problem of “emphasizes theory and knowledge but underestimates practice and innovation”, this project highlights the cultivation of students’ innovative and practical ability, promotes the opening of various scientific research platforms to undergraduates, and enables students to participate in and integrate into scientific research, enter projects, laboratories and research teams as soon as possible. 1) Focusing on the discipline characteristics, a characteristic practical teaching platform with the core of “key discipline-key laboratory-characteristic research of Zhuang and Yao ethnic medicine” is established,

highlighting the cultivation of students' practical ability, and forming the school-running pattern and characteristics of coordinated development of "modern medicine, Zhuang ethnic medicine and Yao ethnic medicine". 2) The collaborative education system of "undergraduate innovation and entrepreneurship project, skills competitions, and mentor projects" and "curriculum system, project-based teaching, and scientific research results" are constructed to demonstrate the teaching highlight of scientific research feedback of "transforming characteristic scientific research resources into educational resources", and truly realize the exploratory learning. Through the tutorial system for undergraduates, students are guided to apply for national and provincial innovative projects for undergraduates, and participate in national and provincial skill competitions to enrich the training methods of innovative ability, thus solving the path problem of scientific research feedback teaching (Pan, Huang, Yang, Huang, Xiao, & Huang, 2018). 3) The second classroom practice brand activities for medical talent training are created to strengthen the cultivation of innovative and practical ability. 7 brand activities, such as pharmaceutical marketing planning and skill competition, have been established with a first-class undergraduate course in district-level social practice to improve the comprehensive quality of students.

4.4. Create a "Pro-Industrial" Training Method Driven by "Integration of Production and Education"

Deepening the reform of innovation and entrepreneurship education in universities and colleges has become a breakthrough to improve the quality of talent training. Base on local specialty, this project adheres to the orientation of local economic and social development and students' employment and entrepreneurship needs, highlighting the application and focusing on the characteristics, to make talent training become the power source of local economic and social development. 1) Industry experts and innovation and entrepreneurship elites from outside the university participate in the whole process of talent training of "training objective formulation - teaching plan revision - curriculum construction - innovation and entrepreneurship projects and competition guidance - talent quality evaluation". 2) For promoting the "integration of production and education" of talent training, we have cooperated with Guangxi Agricultural Vocational College and Dashenlin Pharmaceutical Group Co., Ltd. to develop the coordinated training of application-oriented undergraduate talents of the integration of production and education in Science of Chinese Pharmacology, and established the "production-university-research base" in cooperation with Guangxi Taining Group, which has solved the embarrassing situation of "soloists" of universities and colleges in medical talent training. 3) Through the construction of practice bases in and outside the school, the training of "dual-qualification" teachers has been strengthened, and the researchers and scientific research backbones with professional qualities are invited as off-campus internship in-

structors for students to create a real vocational training atmosphere.

4.5. Construct a “Humanistic” Education Method Driven by “Integration of Theory and Practice, Characteristics”

Morality and soul-building are the premise and key to the success of talent training in universities and colleges. To carry out the fundamental task of morality education and people cultivation, we must integrate value shaping, knowledge imparting and ability development, and promote the organic unity of “value guidance, knowledge exploration, ability development and personality cultivation”. 1) This project establishes and implements the “first head teacher” system for party members, effectively solving the problem of the disconnection between teachers’ ideological and political “theory” and students’ “real” life and the problem of “three aspects of education” to focus on the multi-channel infiltration of red culture. 2) Pay attention to the edification of traditional Chinese medicine culture, and make use of red culture genes and resources of Baise and brand activities of “Yaoyuan Stars, Rainbow Project” to combine medical Moocs, ideological and political classes with traditional Chinese culture classes in “Xu-xi.cn”, promoting the integration of curriculum ideological and political education and traditional Chinese medicine culture to give full play to the synergistic effect of “traditional Chinese medicine culture + curriculum ideological and political education”; focus on the research of Zhuang medicine and Yao medicine to solve the problem of cultural infiltration of traditional Chinese medicine (Wang et al., 2018). 3) A humanistic education system of “integration of theory and practice, wisdom guidance and characteristics of traditional Chinese medicine” has been built. To strengthen students’ confidence in traditional Chinese medicine culture, cultivating medical talents who revere life, respect patients, use drugs normatively and reasonably and have noble medical ethics.

5. Practical Achievements of Medical Talent Training

After years of reform and practice, this project has achieved fruitful results in medical talent training, created a new mode of high-quality application-oriented talents with local characteristics and the actual situation of the school, put forward a theoretical and practical teaching system with the core of developing students’ innovative and practical ability, and established diversified teaching methods under the mode of school-enterprise cooperation in education to realize the mutual benefit of teaching and learning.

5.1. Remarkable Overall Effect of Talent Training

The “Four-in-one” medical talent training mode driven by “Wisdom, Integration and Characteristics” has been successfully put into effect and promoted in our university. The employment rates in recent five years are 96.74%, 97.70%, 98.36%, 97.47% and 92.50% respectively. The employers of graduates are mainly hospitals, pharmaceutical enterprises and public institutions, and the graduates are generally praised by the employers. The questionnaire survey shows that the

new teaching mode has stimulated students' interest in learning and exploration, and students' comprehensive ability has been significantly improved. In recent years, under the influence of "Four-in-one" medical talent training mode driven by "Wisdom, Integration and Characteristics", our students have won more than 50 awards in various competitions nationwide and in Guangxi. Among them, 1 special award, 2 first awards and 3 second awards which were won in the National College Students' Experimental Skills Competition; 4 awards were won in the Provincial Chemical Industry Competition, and students' practical and innovative ability were comprehensively developed and greatly improved.

5.2. Students' Innovation and Entrepreneurship Ability Has Been Significantly Improved

Under the support of the characteristic teaching platform with the core of "key discipline-key laboratory-characteristic research of Zhuang and Yao ethnic medicine", the development of students' practical ability has been highlighted. Students actively participated in the research projects of tutors in and around the school, and undergraduates have cooperated with their tutors to publish academic papers and apply for national invention patents. In recent 5 years, undergraduates have obtained 3 national projects funded by the Innovation and Entrepreneurship Training Program for College Students and 20 provincial projects, which have comprehensively developed and greatly improved their scientific research ability, innovative ability and practical ability. In order to improve students' entrepreneurship and employment ability, since 2015, relying on the national policy of promoting college students' entrepreneurship and employment, we have cooperated with Baise Human Resources and Social Security Bureau to train 150 graduates majored in Pharmaceutical Science (especially those who are targeted poverty alleviation graduates), as well as medical commodity salesmen and traditional Chinese medicine salesmen, training a total of 256 graduates in two periods. After passing the examination, graduates will be awarded the professional and technical certificates of medical commodity salesmen and traditional Chinese medicine salesmen. The training has improved students' employment competitiveness and expanded employment channels.

5.3. The Overall Level of the Teaching Team Has Been Improved Significantly

The excellent evaluation rate of students on school teaching and educating is constantly improving, and the satisfaction rate of graduates on school teaching and educating is as high as 98.18%. Since 2012, the teachers have presided over 10 provincial educational reform projects, edited 2 undergraduate textbooks, subedited 4 undergraduate textbooks, and built 7 teaching platforms such as GMP pharmaceutical preparation simulation training; they have won 1 award of first-class undergraduate course of provincial social practice and 1 award of first-class undergraduate course of virtual simulation experiment teaching; they have also won an award in the 2017 National Educational Informationization

Outstanding Project; besides, there were 2 teachers who won the third award or above in the National Competition of Basic Teaching Skills for Young Teachers in Medical Universities and Colleges, 2 won the third award or above in the Teaching Competition of Young Teachers in Universities and Colleges of Guangxi, and 3 won the first award in the School-level Young Teachers' Basic Teaching Skills Competition; moreover, 4 awards were gotten in Guangxi Higher Education Teaching Software Application Competition. 1 team was awarded the School-level Teaching Team; 2 teachers were awarded the School-level Outstanding Teacher.

5.4. The Level of Running a School Has Been Improved Significantly

After years of practice, this system has continuously promoted the development of teaching, and has won the following awards: Integrated Construction Project of Characteristic Majors and Experimental Training and Teaching Base in Undergraduate Universities and Colleges of Guangxi (Pharmaceutical Science), Provincial First-class Undergraduate Majors Construction Point (Pharmaceutical Science), Provincial First-class Undergraduate Courses of Virtual Simulation Experiment Teaching, Provincial First-class Undergraduate Courses of Social Practice (Skill Practice of Pharmaceutical Science), Key Laboratory of Universities and Colleges of Guangxi and School-level Key Laboratory; In 2019, the "production-university-research base" was established in cooperation with Guangxi Taining Group. In 2020, we have obtained the authorization of master's degree in Pharmaceutical Science, which enhance the level of talent training.

6. Conclusion

With the "Four-in-one" medical talent training mode driven by "Wisdom, Integration and Characteristics" in ethnic minority areas, we take the educational informatization as the endogenous variable of systematic reform of education, take "integration of science and education, integration of production and education, and integration of theory and practice" as the focus to improve the quality of medical talent training, relying on research with regional characteristics such as key disciplines and key laboratories to cultivate the application-oriented talents with certain research and development ability of Zhuang and Yao ethnic medicine, and have realized the coordinated development of "knowledge imparting, ability development, post competence and quality development", highlighted the development of students' practical ability and innovative ability, and promoted the coordinated development of professional education and innovation and entrepreneurship education. This project has realized the integration of production and education, school-enterprise cooperation and cooperation among schools, and truly solved the problem of disconnection between colleges and social needs. This project has built a humanistic education system of "integration of theory and practice, wisdom guidance and characteristics of tra-

ditional Chinese medicine”, focused on cultivating talents with firm confidence in traditional Chinese medicine culture, effectively solved the problem of traditional Chinese medicine culture being forgotten and abandoned, achieved obvious results, produced good social effects, and provided a new way for medical talent training, which has good popularization and reference value. However, we also clearly realize that with the progress of the pharmaceutical industry, it is necessary to continuously enrich the connotation of the talent training of this project in order to truly cultivate high-quality application-oriented talents to meet the needs of the society.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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