The Construction of Clinical Medical Skill Training System based on Modern Apprenticeship

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Abstract: Modern apprenticeship is one of the main models of the integration of industry and education in higher vocational colleges. A scientific and reasonable curriculum system is conducive to the implementation of modern apprenticeship personnel training. This paper takes the Modern Apprenticeship of medical equipment maintenance and management major of Guangdong food and Drug Vocational College as an example, and expounds the process of constructing the professional curriculum system based on the modern apprenticeship and guided by the working process.

1. Preface

In January 2017, the 13th five year plan for the development of National Education issued by the State Council pointed out that it is necessary to "promote the vocational education mode of integration of industry and education, adhere to the school running direction of market-oriented, service development and employment promotion" and "actively promote the modern apprenticeship system of school enterprise joint enrollment and joint training". The modern apprenticeship system has become one of the main models of the integration of industry and education in higher vocational colleges.

In order to deepen the integration of production and education of medical device specialty, explore and practice the modern apprenticeship training of medical device specialty, Guangdong food and Drug Vocational College and Guangdong Taibao Medical Technology Co., Ltd. (hereinafter referred to as Guangdong Taibao company) jointly carried out the modern apprenticeship pilot of medical device maintenance and management specialty. It is aimed at the independent recruitment of former senior high school graduates and secondary vocational graduates. When the students get the academic status, they sign an agreement with Guangdong Taibao. Determine the apprenticeship status of the "prospective employees" of the students, and then accept the joint training of the school and the enterprise as students and apprentices in the next three years. The training objective of this major is to cultivate high-level technical talents who are engaged in the production and manufacturing of medical devices, quality inspection, quality management, product registration, product sales and technical services, and who can meet the requirements of key positions of Guangdong Taibao company, with high professional quality and good management ability.

Scientific and reasonable professional course system is one of the most core elements of modern apprenticeship. Based on the pilot of modern apprenticeship, combined with the actual needs of Guangdong Taibao company, this paper studies the construction of medical device maintenance and management professional course system, and constructs the medical device maintenance and management professional course system based on modern apprenticeship.

2. Construction of Curriculum System of Medical Device Maintenance and Management under the Concept of Modern Apprenticeship

"Ability based curriculum reform" and "systematic curriculum reform based on work process" are two main ideas of curriculum reform in Vocational Education in China. This paper takes the

course reform of the systematization of the working process as the guiding ideology, and carries out the design of medical device maintenance and management professional curriculum system.

According to the law of apprentice's growth and cognition, we should pay attention to the integration of academic education and post training, and the combination of teaching process and production process. It breaks the framework of the discipline system and constructs the professional curriculum system based on the post (Group) work process. The construction process of medical device maintenance and management curriculum system is as follows:

1. Position the main positions of professional services through post research. Guangdong Tai Bao company is a national high and new technology enterprise. It mainly produces and sells three series of passive medical devices, such as ionic paste, water gel and new functional medical dressing, and medical electronic instrument products. The main positions corresponding to this discipline include production and manufacturing positions (groups), quality inspection positions (groups), quality management positions (groups); expansion positions include registration management positions, product sales positions and after-sales technical service positions.

2. Job task and professional ability analysis. Post vocational ability analysis is the starting point of curriculum system construction. This major has designed the post work task and vocational ability questionnaire. In the process of determining the post (Group) work task, it analyzes the professional ability required to complete the task. Table 1 is the analysis table of work task and professional ability for passive medical device quality inspection post.

3. Set up professional courses according to the working process. The curriculum is set up according to the typical work tasks concluded. The content of the curriculum is mainly process knowledge, supplemented by the understanding of appropriate and sufficient concepts and principles. Table 2 is the main courses of the major determined according to the typical work tasks of the professional posts. In addition, there are four basic courses of human anatomy and physiology, introduction to clinical medicine, basic chemistry and microbiology.

Table 1 analysis table of task and occupational ability of passive medical device product quality inspection position

operating post	work task	vocational ability
Passive medical device quality inspection position	① Make inspection plan ② Carry out inspection operation ③ Record and analyze data ④ Prepare inspection report	① Can correctly interpret the relevant standards of passive medical devices; ② According to different inspection items, determine the reasonable test plan and develop the test process; ③ Proficient in using various physical, chemical and biological performance testing instruments; ④ Able to complete physical, chemical and biological performance testing operations in accordance with the inspection plan; ⑤ Be able to take the correct protective measures to deal with the danger in the inspection process; ⑥ Can correctly record the test data, come out the data error to correctly evaluate the reliability of test results; ⑦ Ability to write inspection reports;

Table 2 main courses of the major corresponding to typical work tasks

Typical job tasks	Corresponding professional courses
Passive medical device production	Medical materials production technology Ion paste product production training Water - based gel product production training Functional dressing product production training
Production and assembly of medical electronic products	Medical electronic instrument production training
Passive medical device quality inspection	Passive medical device detection technology Passive medical device testing training
Quality inspection of medical electronic products	Medical electronic instrument testing technology Safety testing technology for medical appliances Medical electronic instrument testing training
Production quality management	Medical device supervision and management practice Medical device production quality management practice
Medical device product registration	Medical device registration management practice

4. Set up career development courses. According to the special needs of the cooperative enterprises for talents, combined with the needs of the apprentice's career development, the vocational development curriculum module is set up for students to freely choose the corresponding technical skills courses. The core positions of this major are manufacturing, quality inspection and quality management. Apprentices can freely choose to expand their positions in the enterprise, such as product sales position, after-sales technical service position, etc. The professional courses corresponding to these posts are taken as professional elective courses, including business practice, document writing practice, pharmaceutical management practice, medical device marketing practice, medical device Market Research and analysis, mechanical drawing, medical electronic device analysis and maintenance.

5. Set up professional quality courses. Set up the professional quality curriculum module including "Two Courses", which, together with the professional quality curriculum module and the professional development curriculum module, constitute the curriculum system framework of this major.

6. Set up the teaching schedule according to the working process. The curriculum should not only match with the work task, but also determine the order of the course according to the work process, build a reasonable teaching schedule, and realize the integration of theoretical knowledge and practical skills.

3. Implementation of Modern Apprenticeship Curriculum System

In the first academic year, students mainly study in school, supplemented by enterprise training. Basic literacy courses and professional basic ability training are completed in the school, but professional cognition, corporate culture cognition and other practices are completed by special lectures, corporate visits and demonstrations carried out by Guangdong Taibao company.

In the second academic year, the students enter the enterprise as apprentices, teaching 2 days a week and training 3 days on duty. Centralized teaching is a teaching team which is based on the class and combined by the school and enterprise. In the enterprise teaching point, the centralized teaching is carried out, and some special training tasks are designed in the course, which are completed independently by the apprentice in the post work. On the job training is carried out by the enterprise tutor in the mode of "teacher leads apprentice". According to the practice plan, the apprentice needs to participate in the post work and complete other tasks assigned by the enterprise tutor.

In the third academic year, the apprentice completes the internship and graduation project

according to the results of "double selection" of himself and the enterprise. According to the rotation plan, apprentices will study in rotation in at least two departments. The topic selection of graduation project is provided by the enterprise tutor, and completed under the guidance of the enterprise tutor and the school tutor.

Conclusion

The integration of industry and education is an important way of vocational education. The modern apprenticeship is the best mode to implement the integration of industry and education. The establishment of a scientific and reasonable professional curriculum system is the basic work to carry out the training of modern apprenticeship talents. The construction of curriculum system sets up the curriculum structure with the work process as the guidance and the work task as the basis for the selection of teaching content. Through the analysis of the work process of the post, the work task and corresponding professional ability of the post are obtained. The work content is transformed into learning content. Combined with the requirements of vocational ability training, the learning task is formulated and sorted into professional courses. Then according to the special needs of the enterprise and the needs of the apprentice's future career development, set up career development courses and professional quality courses, and finally form a scientific and reasonable professional course system to provide a clear roadmap for talent training.

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