Development of Applied Technology Courses in Colleges and Universities Oriented by Professional Needs—— Taking C Programming as an Example

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Abstract: With China entering a new stage of development, industrial upgrading and economic structure adjustment are accelerating, and the demand for technical and skilled talents in all walks of life is becoming more and more urgent. It is imperative to cultivate applied technical talents. A large number of ordinary undergraduate colleges and universities are changing to applied talents. At present, ordinary undergraduate colleges and universities in the process of application-oriented transformation urgently need to develop a number of application-oriented courses with the guiding ideology of "carrying out teaching activities according to the requirements of real environment, learning, doing and mastering real skills". At this stage, in order to implement the transformation from national ordinary undergraduate colleges and universities to applied technology colleges and universities, many colleges and universities have embarked on the road of transformation. In order to effectively cultivate applied talents, we need to be in line with social needs. This paper describes the development process and methods of Applied Technology Courses in Colleges and Universities Based on professional needs and taking C programming course as an example. A scientific and perfect development process and methods of applied technology courses can develop more and better excellent courses, help ordinary undergraduate colleges and universities quickly transform to applied technology colleges and universities, and help cultivate applied technology talents.

1. Research status at home and abroad

In the 1960s, Germany, the United States, Britain and other economically developed countries highlighted applied education. Through practice, they have both similarities and characteristics in the training of applied talents. The development practice of many countries has proved that the quantity, quality and structure of technology applied talents not only determine a country's international competitiveness to a great extent, but also affect the development speed and efficiency of an industry to a great extent. After decades of exploration, applied talents training in major developed countries abroad has achieved more successful experience and formed a more fixed model.

In recent years, China has strengthened the training of applied talents. On January 24, 2019, the State Council issued the implementation plan of national vocational education reform, which

proposed to improve the modern vocational education system with equal emphasis on academic education and training, unblock the growth channels of technical and skilled talents, and develop professional demand-oriented and practical ability training The training mode of professional degree postgraduates through the combination of production, study, research and application will promote the transformation of qualified ordinary colleges and universities to application-oriented, encourage qualified ordinary colleges and universities to set up applied technology majors or courses, and carry out pilot vocational education at undergraduate level.

As China enters a new stage of development, industrial upgrading and economic restructuring are accelerating, and the demand for technical and skilled personnel in all walks of life is becoming increasingly urgent. It is imperative to cultivate application-oriented talents, and a large number of ordinary undergraduate colleges and universities are transforming into application-oriented ones. At present, ordinary undergraduate colleges and universities in the process of application oriented transformation are in urgent need of developing a number of applied technology based courses under the guiding ideology of "learning and doing really to master real skills in real environments".

At this stage, in order to implement the transformation of national ordinary undergraduate colleges and universities into application-oriented colleges and universities, many colleges and universities have embarked on the road of transformation. In order to effectively cultivate application-oriented talents, we need to meet the needs of society. This paper describes the development process and methods of the applied technology curriculum in colleges and universities, taking the "C Program Design" course as an example. Scientific and perfect development process and methods of applied technology courses can develop more and better excellent courses, help ordinary undergraduate colleges and universities to quickly transform into applied technology universities, and help cultivate applied technology talents.

2. Basic Ideas of Applied Technology Curriculum Development in Colleges and Universities

In the process of developing applied technology courses, colleges and universities need to have innovative ideas, take career needs as guidance, extract professional knowledge points and ability requirements from career needs, and benchmark them to professional courses. According to career needs, the courses decompose knowledge content into several lesson points, reorganize the lesson points by completing real projects, and finally complete the learning of this course. This kind of teaching process breaks the traditional chapter teaching, introduces "integration of production and education, dual education between schools and enterprises" into teaching, strengthens the training of application ability, strengthens the closeness between the major and the industry, and improves the matching between the training objectives and the industry needs.[1]

The basic idea of Applied Technology Curriculum Development in Colleges and universities is to train applied technology talents as the purpose, take professional needs as the guidance, and start the development from four aspects: curriculum orientation, curriculum design, curriculum implementation and curriculum evaluation. First, clarify the ranking of the course in the talent training program and determine what training objectives the course needs to achieve. Then, analyze the professional needs from the professional posts related to the major, extract the professional knowledge and ability to be mastered, target them to specific courses, determine the teaching objectives of the course, divide the knowledge content of the course into specific course points, design real projects, and reorganize the course points, Learn and consolidate the course points while completing the project, and finally complete the learning of this course. During the course implementation, the "integration of industry and education and dual education of schools and enterprises" are introduced into teaching, real projects are designed, real practice is organized, and students can really learn, practice and master real skills in a real environment. Finally, in order to

track the teaching effect in real time, it is necessary to evaluate the curriculum, mainly based on ability evaluation, set curriculum evaluation standards, and realize multiple standard assessment.[2]

3. The main contents of Applied Technology Curriculum Development in Colleges and Universities

The development of Applied Technology Curriculum in Colleges and universities should be carried out from four aspects: curriculum positioning, curriculum design, curriculum implementation and curriculum evaluation. Taking C programming course as an example, the development process is shown in Figure 1.
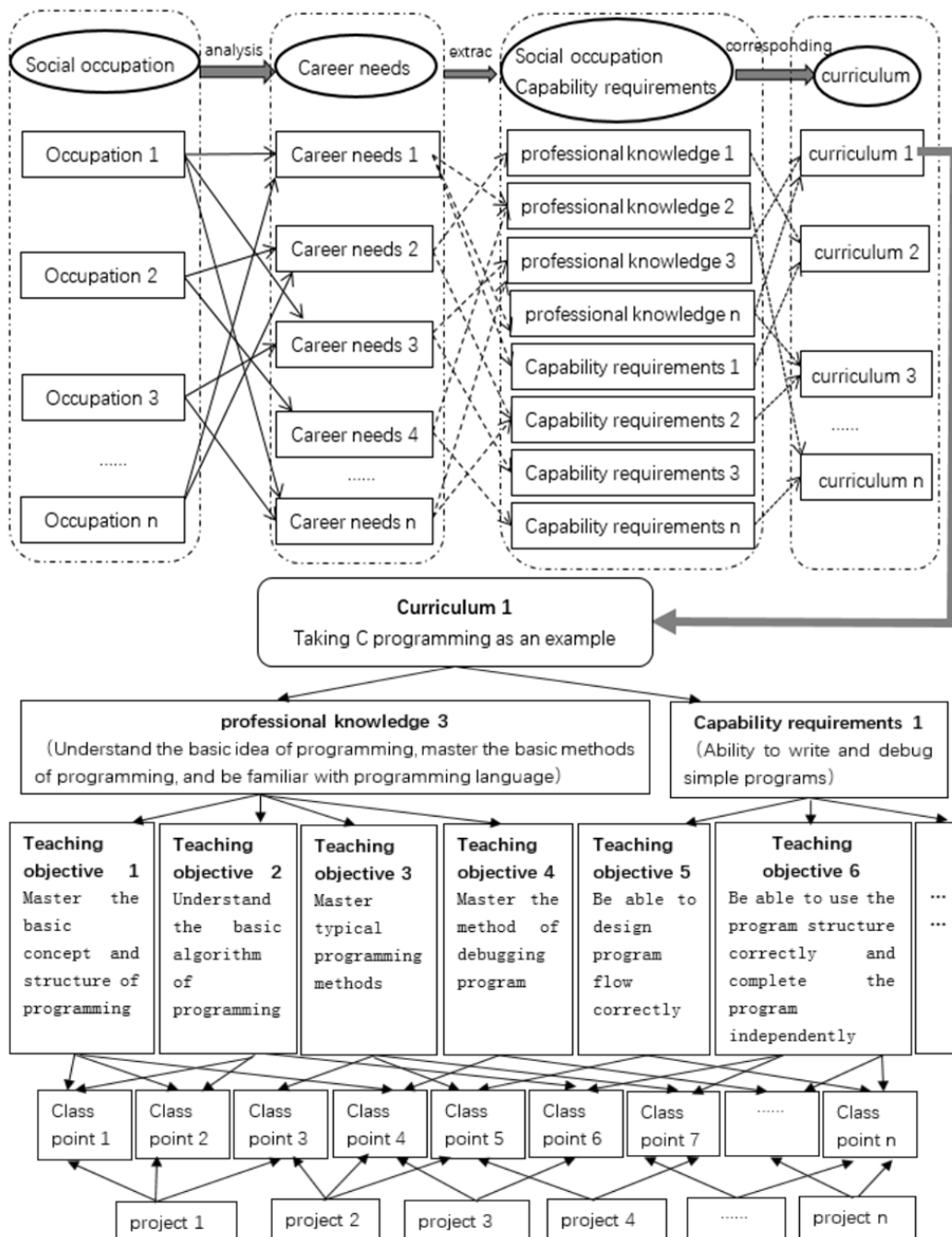

Figure 1. Development process of Applied Technology Curriculum

3.1. Course Orientation

Before developing the applied technology curriculum, it is necessary to accurately locate the curriculum. According to the talent training plan of the specialty, clarify the training objectives, which training objectives the course needs to serve, and determine the position and supporting relationship of the course in the whole talent training plan.

3.2. Curriculum Design

Guided by the professional needs, analyze the occupations related to the specialty in the society, analyze the professional needs of each occupation, extract the professional knowledge points to be mastered and the ability requirements to be achieved from the professional needs, and benchmark the extracted professional knowledge points and ability requirements into specific courses, which will constitute the curriculum system of the cost specialty. For each course in the curriculum system, we need to develop it into an applied technology course, determine the teaching objectives of the course according to the professional knowledge points and ability requirements corresponding to professional needs, decompose the knowledge content of the course into several course points, and each teaching objective is supported by several course points. Through the design of real projects, We will reorganize the decomposed course points, learn and consolidate each course point in the process of completing the real project, and finally complete the learning of all knowledge contents of this course.

3.3. Curriculum Implementation

In the process of curriculum teaching implementation, the "integration of industry and education and dual education of schools and enterprises" are integrated into teaching. Teachers can cooperate with enterprises to design real teaching projects and real practical links, so that students can really learn, do and master real skills in a real environment. According to the learning situation, choose effective teaching paths and methods.[3]

3.4. Curriculum Evaluation

In the process of curriculum teaching, teachers need to set curriculum evaluation standards. In the learning process of each project, the evaluation standard shall be set for each course point. The evaluation shall focus on ability evaluation to realize multiple standard assessment.

The application-oriented curriculum development process described in this paper is guided by professional needs, extracts professional knowledge points and ability requirements from professional needs, and benchmarkes them to professional courses. According to professional needs, the curriculum decomposes the knowledge content into several course points, reorganizes the course points by completing real projects, and finally completes the learning of this course. This teaching process breaks the traditional chapter teaching, introduces the "integration of industry and education and dual education of schools and enterprises" into teaching, strengthens the cultivation of application ability, enhances the closeness between specialty and industry, and improves the matching between training objectives and industry needs.

4. Methods of developing applied technology courses in Colleges and Universities

The development of applied courses needs to be carried out by a combination of various methods. First of all, we need to conduct social research, visit enterprises and collect recruitment information,

sort and divide the existing posts in the society, sort the post heat according to the post demand, and then analyze the hot posts and talent shortage posts.

Then, according to the principles of information theory, system theory and cybernetics, the information collected in the previous investigation is classified, extracted, analyzed and sorted out, and the processed information is applied to practice. In the process of application-oriented curriculum development, formulate personalized implementation plan, analyze the implementation situation through practice, adjust the implementation plan in real time, practice repeatedly, summarize and record the experience, and finally form valuable written materials.

Finally, carry out a questionnaire survey, collect feedback information through the real questionnaire survey results, and understand whether the currently developed curriculum can meet the needs of society and meet the satisfaction of students. In view of the deficiencies, we will continue to revise and improve the curriculum.[4]

5. Conclusion

With the purpose of cultivating applied technical talents and the guidance of professional needs, this paper selects the course "C Program Design" as an example to describe in detail the basic ideas, main contents and adopted methods of the development of applied curriculum from four aspects of curriculum orientation, curriculum design, curriculum implementation and curriculum evaluation. The development of application-oriented courses is not a whim, nor is it arbitrary, but should be carried out in accordance with the standard development process and the correct development methods. A sound development process and correct development methods of application-oriented courses can develop more and better excellent courses, help ordinary undergraduate universities to quickly transform into application-oriented universities, and help cultivate application-oriented talents.

Acknowledgement

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