Discuss on Curricular System Reform of Computer Application Technology Specialty in Higher Vocational Education

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Abstract. Now, the key of strong development of vocational colleges: the employment-oriented and the ability of technology application are the main line to design the student training program and curriculum,then could ensure that the vocational graduate have the ability to direct induction.Acording to development of the Changjiang Delta and future development trend, and in accordance with the existing conditions of the college of changzhou information technology, the education concept of the "working process" and the "working and learning combining" is applied to the teaching, the curriculum mode for the computer application technology specialty is given,the discuss on the problems of practical teaching for curriculum of computer application specialty is analyzed, and the specific measures and suggestions is also given. So,solving the problem of the depth integration of the college and enterprise cooperation, the working and learning combining,and the teaching and learning integrating ; and the basic courses, the specialized courses , the experimental training courses ,and the internships are both the mutual integration and the system,the effect of teaching is significant.

Keywords: higher vocational College; computer application technology; curricular system; practice teaching system; Combining working and learnin

1. Introduction

In the beginning,Higher Vocational Education advance: higher vocational education is running according to career-oriented jobs,and training the skilled applied talent of production and service line.The changzhou college of information technology was listed as a national model construction unit of colleges on March 2007, the computer application technology specialty is also the focus of teaching reform in our school, so it can promote the research work of the curriculum reform and training model. On the other hand, we have analyzed and researched the teaching plan of all 2006-level computer class in our school, and found that the most courses have a relatively large distance from professional positions require, the series of courses and skills system relevant to occupational job are not established,and training program is not rational. Therefore, we started study and practice work of curriculum reform and training model on the computer application specialty in 2008.

2. Training aim

High-level technology applied talent who could be adapted to the first line of production, service and management is the target of vocational education training [1]. Now,the society needs a lot of managers and operators working at the basic level or the production line, vocational education should be oriented according to the basic level and the production line, and training the higher application talent who has the strong practical ability and some professional knowledge. With the popularization of computer application technology, the society needs a large number of technical person with the computer installation, debugging, maintenance and repairment, but also requires many person with the technology of electronic product design,

commissioning and maintenance. The sales who don't the design and development work also need to understand some embedded and microcontroller technology, so,they could familiar with the operation and services of embedded products. It's visible that the application of talents with the embedded expertise and strong practical ability are large demand, and the knowledge structure of them are different requirements according to the need of the different industries. Therefore, the training program of computer application specialty in higher vocational education must be closely with the demand of the production first line basic level, the design of the training program must be suitable to result of full investigation about the talent market training, so the positioning of higher vocational education can be guaranteed.

3. Constructing Reasonable teaching system

We have developed an in-depth research about a number of cooperative enterprises on march,2008,such as Hongtusanbao High-Tech Co.,Ltd, Changzhou Fei Yin Electronics Co.,Ltd, Changzhou Ying Gang Data Systems Co.,Ltd,Nanjing Qin Heng Electronics Co.,Ltd,etc.We have further defined the localization and training goal by understanding of the needs of business professionals , and a larger reform in the curriculum and teaching is carrying out, the "project platform + employment-jobs" curriculum of the computer application technology specialty is given in our school[2], shown in Figure 1.
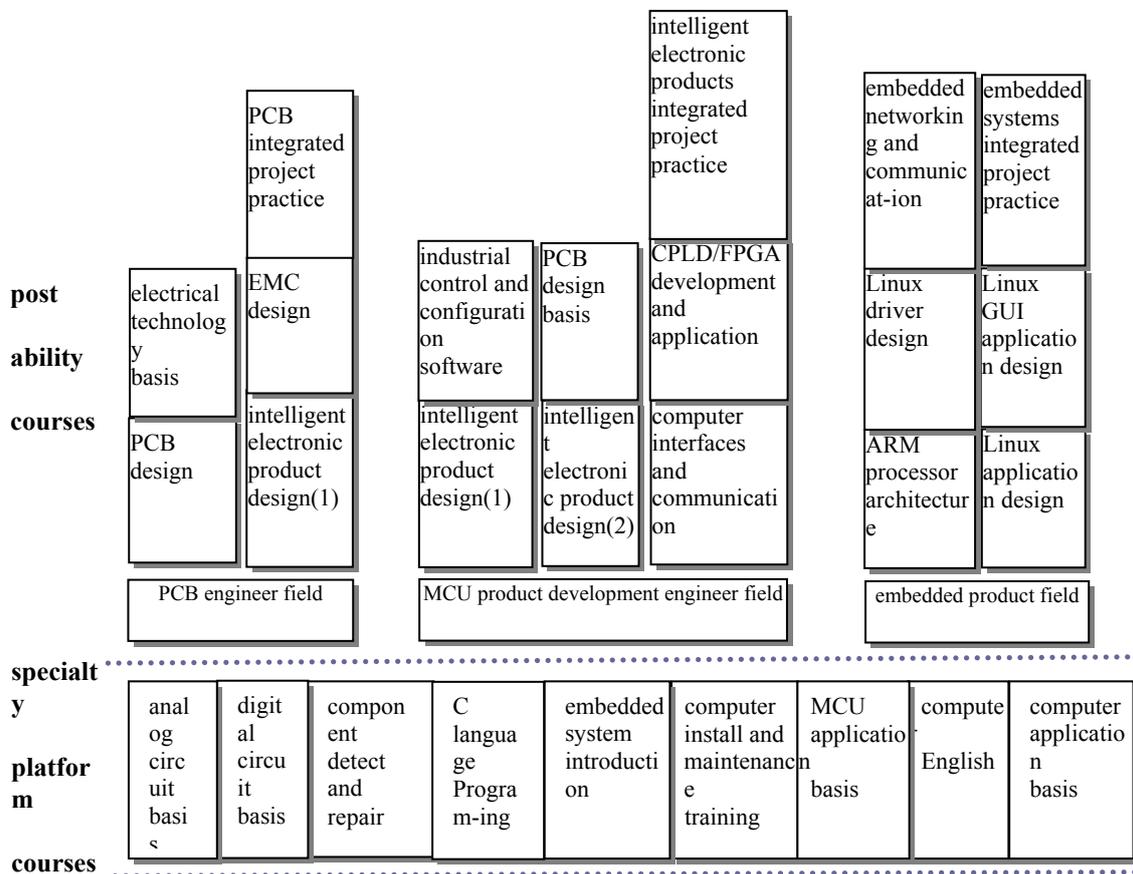

Figure 1 The "project platform + employment-jobs" curriculum of the computer application technology specialty

4. Setting "Project Platform + Eemployment-jobs" Curriculum

a) Reflect "the employment needs -> determine post -> identification of capacity (skills, technology)" principle [3].

b) A professional can establish the 1 or 2 major posts and 2 to 4 expansion positions, the post of different professional can be cross, but the primary and secondary post should be clear.The main post of computer application technology specialty is: printed circuit board designing and producting, MCU product developing

and maintaining, embedded product developing, embedded product technology supporting, embedded product saling.

c) The ability of a professional job can be divided into individual ability (responsibility, professional ethics, professionalism, etc.), key ability (learning ability, work ability, innovation ability, etc.) and technical (skills) ability, such as a MCU development position, its technical (skills) ability include: the ability to use development environment, hardware platform design and production ability, programming ability, comprehensive debug ability, product maintenance ability,etc.

d) Each job skills abilidy should be trained by a series of courses (2-4 main course) teaching, and these courses could be made up the series of courses link.

e) Job courses models: regarding a professional expertise required by the job as a task, and designed as a link course throughout the whole process of academic courses; abtaining the basis of technical knowledge and ability by the major subject curriculum; training the technical ability of vocational need by the course of the project platform.

(2) Professional Post Basic Platform

By researching and analyzing the job ability and career development requirement, the basic platform adapting to the IT industry requirements has been formed.The platform mainly composed of the following nine courses: computer applications basis, computer English, computer install and maintenance, Electronic detection and repairment, analog circuit basis,digital circuit , C language programming, MCU application basis and embedded system application.

(3) Setting Post Sseries Curriculum

a) PCB engineer (PCB design, intelligent electronic products design,electronic technology basis, EMC design, PCB integrated project practice).

b) MCU product development engineer (intelligent electronic product design(1), intelligent electronic product design(2), computer interfaces and communication, CPLD / FPGA development and application , PCB design basic, industrial control and configuration software, intelligent electronic products integrated project practice .)

c) Embedded product development and maintenance staff (Linux application design, ARM processor architecture, Linux GUI application design, embedded networking and communication, embedded systems integrated project practice)

(4) Course Structure and Implementation

The relationship between medium and small courses shown in Figure 2.
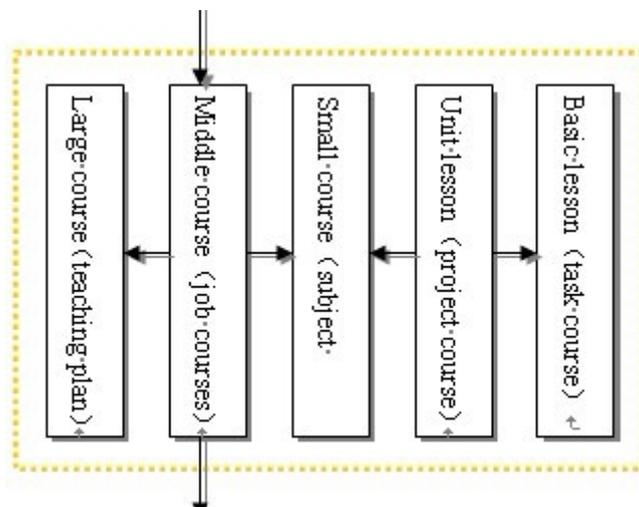

Figure 2   Medium and small courses diagram

a) The professional leader is responsible for building the great course, the position series course leader is responsible for constructing the middle course, the course leader is responsible for building small courses (one course), the teachers are responsible for designing the unit classes and basic lessons.

b) The medium and small courses must be seting the appropriate building team, the course leader is charge for reporting and assessing the course according to title, experience, ability, work and teaching quality.

c) The large course building team consists of the leaders of middle course, the middle course building team consists of the leaders of small course, the small course building team consists of the teachers of the basic lesson and the unit lesson design.

Setting the skill System based on the professional positions—the skill system of professional positions on the computer application technology specialty should be adapted to regional and industry economic and social development ,and meeting the requirements of the technical work on the IT industry professional positions (group)[4]. The skill system is mainly constituted of the following items: basic vocational skills, basic professional skills, professional technical skills, professional technology application ability, professional qualification certificates.

The Assessment of Professional technical (skills) is managed by the Department,and the specific implementation charge for the teaching and research office; the professional qualification certificate can be used to replace some of the professional technical assessment; the implementation of the professional basic skills and technology skills must be in charge of the specialized teachers; each of the technologies (skills) must have a corresponding assessment outline; technology (skills) assessment should be specific and realistic applications, focus on hands-on practice;a corresponding course skills can assess and verify in the curricular;the assessment of professional basic skills could be carrying out on the first school year, the evaluation of professional technical skills could be implementation in high school.

Practice teaching system—the appropriate practice teaching system should be established according to the technical (skills) system and teaching rules of the computer application technology specialty, the practice teaching system must meet the implementation requirements of the professional technical (skills) system[5]. According to the training aims of higher vocational education,we must attach importance to practical teaching for training the first-line application talen, because the practice teaching can help students improve their hands-on practical and brains ability; help them enhance the ability of observe and solve problems; help them develop the setback ability, in order to cultivate the good will quality of students and practitioners quality. In the training program of computer application technology specialty, the practice teaching hours have been about 50% of the total teaching hours.A new practice teaching system has been formed,the teaching system course include: basic skills teaching, unit practice teaching, the second classroom practice project teaching, holidays social practice teaching, vocational skills training and assessment, multi-thread semester project teaching, graduation practice (internships), and supporting the appropriate development training rooms and training project,the training process is from easy to difficult,from simple to comprehensive, spiral, as shown in Figure 3 and Figure 4.

A. professional basis training	B. basic circuit training	C. computer basis training
A.practical writing B.public relations and etiquette C.reading and understanding	A.electrical safety B.equipment tool C.welding and debugging	A.text entry B.presentation editing C.electronic form processing
D. hardware design training	E. software tools training	F. install and maintenance training
A.PCB design B.circuit board debugging C.component detect repair	A.Keil, Proteus B.Quartus II IDE C.Protel Dxp	A.system maintenance B.computer install C.computer repairment

Figure 3 Training room and training project

Course basic skills teaching: course basic skills teaching include the two parts: the curricular basic skills and exercise and curriculum design project teaching

Integrated project teaching: a integrated project teaching is the core of the whole teaching system, each series of courses should be setting one integrated practice teaching or more, and in accordance with the corresponding professional post requirement,the way of section centralized teaching is usually used to the system.

The second class project practice teaching: the second class project practice teaching has embodied the principle of curricular and extracurricular combine,it is also the important supplement and improvement of the basic skills teaching and unit practice teaching. Each project must be specified a corresponding project leader organizijng teaching, assessing, evaluating.
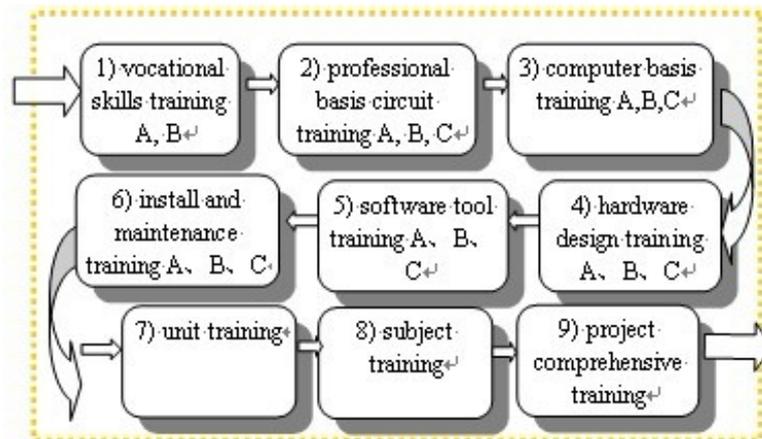

Figure 4 Computer application training roadmap

Vocational skills training and assessment: vocational skills training and assessment is the effective measure on promoting the "double certification" institution and innovating the training mode. Adjusting the teaching content and curriculum,putting the vocational qualification certificate courses into the teaching plan, improving the training program,innovating the training model, and strengthening the student skills.

Integrated project teaching: the serial multi-semester project teaching, which is the practice of teaching activities running through the entire process or more than academic semester, and the main form of teaching is the project,it teaching method is based on the professional post courses , progressively increasing the knowledge,and organizing the teaching by, supplemented by student-teacher organization for teaching by the student one and teacher second way,the professional leader is in charge of the whole design,the position series course leader is responsible for the project design,the course leader is responsible for the project guidance. each student can choose one or two project to design,the project generally is arranged in the end of the fourth semester or the beginning of the fifth semester, the students need to design for one or two semester, and gradually improving and completing, the teacher could give score according to the process and result.

Innovation—"Project Platform + Employment-jobs" Curriculum Innovation:the curriculum based on the "project platform + jobs" is certain innovation, the research results have been written into our teaching plan. For example,"PCB engineer ", "MCU product development engineers","embedded product development and maintenance staff, ""Computer install and debugger staff "," programmer ", etc, the five post courses has been implemented effectively. and the construction of the relational courses is also significant effect. A suitable basic course platform for IT, a job series courses system and a professional job skill system for IT have been builted and actively implemented, so ,it can greatly enhance the responsibility and initiative of the professional leader, the position series course leader,and the course leader of the course,it also can significantly improve the efficiency of the curriculum development .

The Skill System of Computer Application Technology Specialty Innovation:the skill stystem of computer application technology specialty has been established, each skills project has the project leader and assessment criteria. The teaching activities of the project case and project practice are very effective,for

example, the small work production, especially the " integrated project teaching Running through serial semesters " the activities starting will promote the " master and apprentice training model" .

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