Exploration of a Curriculum System Reform of Embedded Technology and Application Based on Cloud Services

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Abstract

A specialized curriculum system design based on the work process systematization is a kind of design method commonly used in higher vocational education. By taking "necessary" and "enough" as principles, introducing the concept of cloud services and analyzing the professional occupation and capacity of application of embedded technology majors, this paper makes the professional training objectives of the embedded technology and application majors, draws the typical tasks in the field of action and finally concludes a curriculum system of application of embedded technology and curriculum which matches cloud services.

Keywords: working process systematization, cloud services, curriculum system, embedded technology and application

1. Introduction

In recent years, the rapid development of Embedded Technology, embedded product has penetrated into all walks of life, such as small as smart phones, palm computer, to medical devices, robots, aerospace equipment and so on are all examples of embedded system and embedded technology and applications has become one of the current top most promising industries. However, the embedded technology is an integrated, strong, technologies change fast profession, involving software, hardware and applications in various industries, and many other elements in the design of curriculum system, based on systematic work process on the one hand that required courses in professional systems, on the other hand features full use of cloud services, optimize curriculum, save resources, reduce the cost of teaching.

2. The construction of working process systematization curriculum system using cloud services

The education cloud services, refers to the use of virtualization, load balancing and distributed storage technology, computing platform to build a unified intelligent open architecture, deep integration of various resources, platform and application, on-demand rent or free service to the user, satisfies the user terminal completes the education information through a variety of teaching, learning, research, management, social interaction and other aspects of demand, to realize issuing education information, access to teaching resources, teaching interaction, statistical education information and data, the formation of scientific decision-making, implementation of education evaluation, to carry out a series of activities such as collaborative research. The use of cloud services, as long as have a network and terminal equipment, you can use like water and electricity, anytime, anywhere, with the need to have one's words at hand

education resources, access to education services.

Courses based on work process oriented development method is a professional education curriculum development should be based on systematic work process, should be based on the actual work process needs to boot. Working process systematization of the curriculum is based on and built around professional activity "to complete a piece of work tasks and obtain the results of a complete working program" set up curriculum system, this fundamental difference is its systematic courses and disciplines. Take advantage of cloud services, schema method based on work processes in a large number of samples to make it more inclusive, representative and from the conclusions of the authenticity.

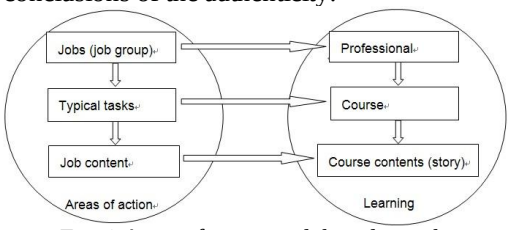

Fig. 1 Areas of action and the relationship between fields of study

Work descriptions and analysis on occupational capacity reflects the content of professional activities, the use of certain methods, typically one or more task to transition to the "course", which means the professional details "action areas" into teaching in the context of the "learning areas", corresponding to their relationship as shown in Fig. 1. Areas of action refers to the professional tasks, is highly relevant to the occupational career, life and social action constitutes a sum of the professional competence of its mandate. Summarized are areas for actions in the field of teaching and learning, the vocational fields of action are summarized for vocational school teaching areas for action. Learning is to occupation ability development as the goal. Learning is the learning area of concrete, is working closely with career related Job tasks in the action scenes was reflected in the teaching process.

Based on the above discussion, the curriculum based working process systematization design consists of two components, on the one hand positions (positions group) and typical job task analysis and design of curriculum structure for the overall, on the other hand to the contents of a typical task analysis and teaching contents of single door design which focuses on the former.

3. The analysis of post, occupation ability and typical working task

With the research and development of application of embedded technology, embedded technology professional also shows diversity, an embedded product from development to applications involving more than one post, from a different point of view can have a different classification method. Through market research, information and electronics companies, such as cooperation with Shenzhen road, from embedded product development, testing, maintenance, technical support perspective, summed up the basic embedded jobs for higher vocational students analyze table, as shown in Tab. 1.

Through above embedded career post and the capacity requirements analysis, on the employment-oriented vocational education, can determines embedded technology professional training target for has good of integrated quality and team spirit, master computer hardware based, understanding embedded system of software engineering technology, master hardware and software development, and debugging and test, various tools of using method, preliminary with embedded system software and application software development capacity, to engaged in embedded system application development, and products test, and technology support, and Sales management of skilled personnel with high quality. According to theories based on work process oriented and typical job task analysis

Tab. 1 Embedded technology and application of professional job analysis form

Number	Professional name	Jobs	Capacity requirements
1	System development	SCM engineer	1. Mastering one or two types of single-chip, familiar with common microcontroller peripheral devices; 2. With Assembly language and c language and related programming; 3. Master electronic CAD tools and integrated debugging tools;
		Embedded application development engineer	1. Understanding embedded operating systems theory, master application development skills; 2. Proficient in c and C++, use related software for editing, compiling, and debugging; 3. Have good communication skills, ability to learn and team spirit.
		Embedded systems development engineer	1. Master the principles of embedded operating systems, use tools for editing, compiling, and debugging; 2. Write a program in c and C++, related document writing, finishing; 3. Have good communication skills, ability to learn and team spirit.
2	System testing and maintenance	Hardware test engineer	1. Related equipment can use to distinguish the hardware; 2. To read schematics, software simulation tool to test hardware; 3. Good ability of communication, learning and team spirit.
		Software test engineer	1. Be familiar with software test tools for embedded software testing; 2. Read the hardware schematics, software testing information is mapped to related hardware; 3. Have good communication skills, ability to learn and team spirit.
		Hardware maintenance engineers	1. possess basic knowledge of hardware and debugging capabilities; 2. familiar with welding tools repair damaged parts; 3. Have good communication skills, ability to learn and team spirit.
3	Technical support	Product marketing engineer	1. Have good communication and presentation skill, can according to customer demand to provide the relevant product; 2. Familiar with the performance of their products, and knowledge of other products in the same industry, comparative advantages and disadvantages; 3. Familiar with development of embedded products, use, demonstration of proficiency-related products;
		Technical support engineer	1. Be familiar with process, familiar with various development tools and development environments; 2. Quickly determined that product problems, propose solutions, guiding customers to use;

For various jobs and further summarized areas of action. So-called typical tasks must have a certain degree of representativeness, embedded technology typical of many positions with the same or similar tasks, to avoid duplication, this professional name order, summarize the typical embedded professional work assignments as shown in Tab. 2.

Tab. 2 Typical of embedded professional job task analysis form

Number	Professional name	Typical tasks	Action field induction
1	System development	Understand the needs of the project, proposed the system solution	Engineering modeling
		Preparation of standard software development document	
		Writing, debugging, embedded systems applications	Embedded system programming
		Writing, debugging, embedded systems drivers	
2	System testing and maintenance	Analyzing circuit principle, develop test scenarios	Hardware circuit testing
		Use of test instruments and test chips, boards and interface circuit	
		Set up the test environment, the use of embedded operating systems, application software testing tool for testing	Software testing
		Write software test documentation	
3	Technical support and sales	Synergy sales engineer pre-sales technical support	Technical support
		Presentations, explanations, answers technical questions raised by users	
		Prospecting potential clients, solution, tenders, participation in tender	Product sales
		Delivery, acceptance and customer service return	

4. Embedded curriculum system

Action is a high-level overview and summary of professional activity in the field, is the process of systematic curriculum development platform, you must convert it according to the vocational education basic law learning area, materialized as a course. Due to the application of embedded technology and professional capacity required by various jobs overlap and cross, therefore, embedded professional learning transformation in the area of the field of action is actually multiple maps, is clean and simple, see, fields of action listed here correspond to fields in the main courses, as shown in Tab. 3.

Tab. 3 Embedded into the field of professional fields of action to learn table

Areas of action	Field of study (courses)
Engineering modeling	Engineering mathematics, C language programming, software engineering, specialized English
Microcontroller programming	Principle of single-chip, single-chip system design
Operating system programming	Embedded real-time operating system, embedded Linux operating system
Hardware circuit testing	Digital and analog circuits, electronic design based on CAD
Hardware maintenance	Computer Assembly and maintenance
Software testing	Embedded system software test
Technical support	Marketing

As can be seen from the above table, by occupational field conversion courses for professional courses to develop the professional expertise required. To make higher vocational students' creative quality, must also develop their skills and social skills. According to "teaching module of, learn practiced integration" teaching thought, in based courses system of, and Humanities quality courses professional, and professional core courses professional, and professional expansion courses forward of principles, combined table 1 in the on career post capacity of analysis, on table 2 of professional courses be added and perfect, came embedded technology and application professional of whole courses system, as shown in Fig. 2.

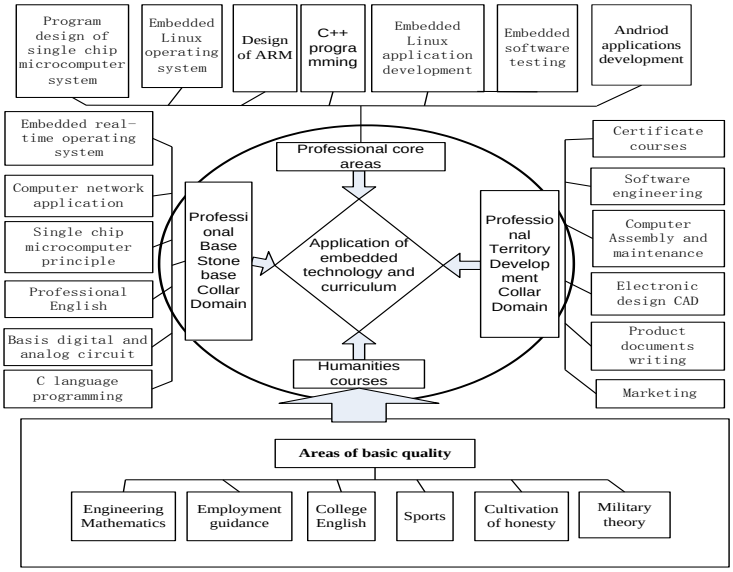

Fig. 2 Application of embedded technology and professional curriculum system

5. Conclusion

In summary, based on working process of embedded technology and its application in higher vocational education curriculum system is working as the main line, employment-oriented, based on professional ability, according to the job while working the necessary knowledge, ability and quality, analysis and reconstruction of curriculum, providing students with a very different learning experience? While under the post general competency requirements and requirements of professional quality, build public infrastructure programmers and the auxiliary to expand course to maximize students ' professional ability, methods, skills and social skills.

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