

Featured Practical Teaching Exploration of Communication Engineering Profession

—Taking Liaoning Institute of Science and Technology as an example

Yinghua Jin

Liaoning Institute of Science and Technology

School of Telecommunication

Benxi, China

E-mail: fjfyh77777@163.com

Abstract—The practical teaching of colleges and universities is the combination of theory and practice, and is the important safeguards for training college students' practical abilities and creative abilities. For integrating the exploration road to featured practical teaching of communication engineering profession, this paper analyzes the present situation of practical teaching in communication engineering profession, studies the reform methods and measures of practical teaching of communication engineering profession, and discusses the teaching effect on students for featured practical teaching. The new and original view in this paper is about the reform methods and measures of practical teaching in communication engineering profession. Featured practice teaching is the top priority of communication engineering profession development. Education reform is to achieve efficient teaching and promote effective learning as the ultimate goal.

Keywords—Education reform; communication engineering; practical teaching; exploration

I. INTRODUCTION

The practical teaching of colleges and universities is the combination of theory and practice, and is the important safeguards for training college students' practical abilities and creative abilities. [1] As an engineering discipline, practical teaching plays a vital role in talent cultivation of communication engineering profession. For most application-oriented undergraduate colleges, how to further improve practical teaching level of communication engineering, how to highlight their own school characteristics, how to improve students' technology abilities, it is an eternal study topic.

II. THE PRESENT SITUATION ANALYSIS OF PRACTICAL TEACHING OF COMMUNICATION ENGINEERING PROFESSION IN COLLEGES AND UNIVERSITIES

A. There are gaps of the development level for practical teaching in different colleges and universities

For practical teaching of communication engineering profession, because of the limit and impact on soft and hardware conditions, the practical teaching environment has a large discrepancy. The practical teaching courses in some colleges and universities cannot keep pace with the

development of the latest technology, not adapt to the requirement of society on talent skill. [2] The other reason of resulting in the gaps of practical teaching development level is uneven development power of teachers, and the limit of capital input, etc. [3]

B. Now practical teaching can not meet the need of practical teaching purpose for cultivating the comprehensive application ability of students

In the context of existing independent training practice, students can put some theoretical knowledge into practice, but there are some gaps about graduates comprehensive application ability and integrated professional quality required by enterprises. Therefore, it cannot reach the purpose of practical teaching for improving comprehensive application ability. [4]

III. REFORM METHODS AND MEASURES OF FEATURED PRACTICAL TEACHING OF COMMUNICATION ENGINEERING PROFESSION

A. The recommendation of advanced experimental facilities installation and laboratory construction

1) Communication engineering profession has advanced equipment laboratory in Liaoning Institute of Science and Technology

Firstly, communication principle lab

It was established in 2003, with 105 square meters area and the total value of equipment of this lab 2.742 million Yuan. It bears related experiment of communication principle course. The whole experiment installation was bought from Germany with Austria loan, the whole equipment level was advanced, and basically it could provide the whole communication principle course experiment. Figure 1-2 presents the communication principle lab. Using the equipment, it could be built all kinds of simple communication transmitting system expediently. It has great differences with national communication principle experiment installation. In practice, the experiment installation of communication principle lab can reflect the Germans mature experience in engineering practice education—focusing on systemic and comprehensive abilities cultivation.



Fig. 1. It presents the communication principle lab.



Fig. 2. It presents the communication principle workbench.

Secondly, GSM system lab

It was built in 2002, with 210 square meters area and the total value of equipment of this lab 5.554 million Yuan, and it could be complete communication practical environment conducting GSM network. Figure 3-4 presents the GSM system lab. The lab has the same operation environment as the practical one of current operators (Unicom and Mobile). This lab is the significant base of mobile communication network practice before students entering society.



Fig. 3. It presents the complete GSM system.



Fig. 4. It presents the GSM system laboratory cabinets.

Thirdly, communication terminal lab

It mainly provides telephone practice and mobile phone maintenance practice for students of communication engineering profession and mobile communication technology profession.

Fourthly, computer network lab

It provides good and advanced practical teaching environment for computer network course. Now it can open the configuration technology of switches, routers, VLAN, and experiment projects of small campus network design and the formation.

2) Outside practice base

It has built a good relationship of cooperation with external cooperation units, and signed a production and education cooperation agreement, established stable out-side practice bases, such as Benxi branch of China Unicom, Benxi branch of China Mobile, Telecom Project Bureau in Shenyang, etc. [5]

B. The construction of Faculty

Most of the professional teachers in this major must attend all kinds of engineering training for improving powerful practical teaching ability. For example, Huawei M900/1800 MSC60, BSC and BTS engineering training, GSM HLR(V36) engineering training, GSM BSS engineering training, GSM MSC/SSP engineering training, IPTV and 3G technology and application training, SDH and MSTP training, etc.

C. The educational reform project of "3+1" talent training mode in communication engineering profession

The talent training mode, the "3+1" mode, was adopted in 2011, which meaning students learning 3 years in school and working 1 year in enterprise. The mode can improve students' engineering consciousness, engineering quality and engineering practical ability, cultivate a large number of communication engineering technology application engineers at undergraduate level.

D. Enterprises participation, the establishment of united cultivating body between school and enterprises

Make full advantage of different educational environment and resources within and outside schools, and combine school education oriented-classroom teaching and enterprises skills training of directly gaining practical experience.

E. Vocational skills identification

The communication laboratories act as a professional skill identified exam site of "subscribers communication terminal maintenance technician" provided by the national ministry of information industry and social labor and safeguard, until now there have been more than 100 students to received certificates of subscribers communication terminal maintenance technician. In addition, the students of this major can pass the exam of mobile system training, a small number of students receiving the certificates of the Huawei equipment debugging assistant engineer, but most students obtaining professional qualification authentication of communication equipment checker, communication switch equipment debugging technician and the wired communication transmission equipment debugger.

F. The participation in students' science and technology competition

In 2009, participated in the national vocational academy skill competition (specialist group) of "zhongxing Cup 3G base station construction, maintenance and data network set-up skill

competition”, the students of the major obtained the team winning price. Participation in students’ technology competition is a powerful complement to the characteristic practice teaching. [6, 7]

IV. THE EFFECT OF FEATURED PRACTICE TEACHING IN COMMUNICATION ENGINEERING PROFESSION IN LIAONING INSTITUTE OF SCIENCE AND TECHNOLOGY

The major has good employment situation, employment rate reaching more than 90% every year recently. The employment situation of students can mostly reflect characteristic practice teaching effect. The main employment trace of graduates is the communication character units, such as telecommunication engineering bureau in Shenyang, Liaoning zhongyi communication technology engineering ltd., Jiangsu province post construction engineering Ltd., China mobile communication group Liaoning company, China united Telecommunication Corporation in Shenyang branch, Shenzhen Huawei technology Ltd., Aowei communication Co Ltd. and Beijing Xinwei communication industry group, and so on. The graduates of the major are technical backbone power, mainly undertaking engineer position, and also some students have such posts as the head of department or the regional manager.

V. THE FUTURE DEVELOPMENT TREND OF FEATURED PRACTICE TEACHING IN COMMUNICATION ENGINEERING PROFESSION OF COLLEGES AND UNIVERSITIES

A. *The combination of Virtual Reality (VR) technology and featured practice teaching*

Personal connection is three-dimensional in virtual reality. People, who are from the original space, break the limitation of time and space can make full use of the remote education teaching. Students, who break the remote teaching space and time limit, attend the study through virtual reality system, choose their own learning place and time, create humanized, personalized learning model, and learn a variety of courses. In virtual course, teachers and students study and discuss together, collaborative interaction study, improve the effect of learning efficiently. In practice and experiment course, students can directly involve in various experiments such as skills training at home, and the school which needn't be obsessed with the school funding problems such as classroom, laboratory equipment, can make use of virtual reality technology to establish the social training institutions, which is suitable for students interested in skills training.

B. *The application of digital classroom in featured practice teaching*

Digital classroom is composed of three parts : network platform, massive resources and high-tech equipment, which can be understood as using text, voice, image and animation and other multimedia teaching interaction to make the teaching content of the vitality, interest and experience, so as to mobilize enthusiasm and subjective initiative of students. Through an extension of the classroom network, let the students learning approach with real-time convenience and continuity, fully

develop the students' innovation consciousness and innovation ability, and improve the teaching efficiency of a new type of teaching mode, is the use of high-tech means of information technology, realize the traditional unidirectional to bidirectional interactive classroom teaching type of new teaching idea. If the main method of classroom teaching today is "from principle to application", the teaching method of robot is "from case to principle". In 2014, e-book Library McGraw-Hill online Library released its latest digital platform, which offers more than 2000 kinds of searchable digital books, collects information from 2,000,000 students and create the adaptive learning experience by artificial intelligence for each student. The study of digital classroom will be one of the teaching modes in the future. It is the one of important higher education research projects to combine the digital classroom and featured practice teaching.

VI. CONCLUSIONS

All in all, featured practice teaching is the top priority of communication engineer-ing profession development. Although featured practical teaching of communication engineering major in Liaoning Institute of Science and Technology has made good teaching effect, it will further practice and explore some new problems raised in the course of practice teaching, constantly summing up experiences and learning lessons from them.

Every new technological revolution is pushing education, and essentially it affects People's Daily lives, learning style and cognitive thinking principle of the world. Education reform is to achieve efficient teaching and promote effective learning as the ultimate goal.

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