Expounding the “2 + 1” Pattern and Co-operative Education Between Colleges and Enterprises

President & Prof. Sun Huaiyu
Professor Wang Rong
Henan Mechanic & Electric Engineering College
China

ABSTRACT
The paper studies the educational and teaching pattern for China Engineering Colleges (CEC) under the condition of marketing economy. By investigation and study, the paper draws a conclusion that both CEC and enterprises have been facing challenges and opportunities, and points out that the cooperative education between colleges and enterprises (CECE), esp. the “2+1” pattern, is the right way and direction for the educational reform of CEC.

INTRODUCTION
CEC has been facing a severe test in the tide of marketing economy: i.e. the guided thoughts of education and teaching, training aims and methods do not suit the requirements of the society. The paper intends to study the educational and teaching way and direction for CEC. From the altitude of the joint between theory and practice, the paper puts forward the cooperative education between colleges and enterprises (CECE) as well as the 2+1 pattern. The paper can be divided into 4 sections: The challenges CEC education faced; The 2+1 pattern put forward; The contents and characteristics of the 2+1 pattern; Recognition on cooperative education between colleges and enterprises (CECE). Three new ideas of the paper: First, find out the reason why CEC could not be developed rapidly in the past. Second, give new and operational contents to CECE, i.e. the 2+1 pattern. Third, put forward the operational mechanism for CECE, guaranteeing the CECE’s normal operation theoretically.

Henan Mechanic & Electric Engineering College (HMEEC) applied two State-grade experimental specialties to China Education Department in the second half of 1997. One is “computer aided mechanic manufacturing technology”; another is “wire & cable processing technology”. In “The Experimental project on the teaching reform” of the two specialties, it stipulates that: Adopt the 2+1 pattern for teaching and education, pay attention to quality, ability and application, making the college education meet the requirements of the society so as for the students to be applicable personnel as soon as they come to the working station. This is the general guided thought on educational and teaching reform of HMEEC. What is the 2+1 pattern? Why adopt the 2+1 pattern? How it is formed? What is the relationships between the 2+1 pattern and cooperative education? How does the 2+1 pattern be operated? What is its mechanism? For these questions, the paper will introduce the practice and knowledge of HMEEC. Your valuable opinions and suggestions will be much appreciated.

THE CHALLENGES CEC EDUCATION FACED
The pattern of college education in China was formed basically from the learning of Soviet Union in the 1950s. There has been no great change for decades, though small reforms were carried out in the past. China has made reformation for more than 10 years. The level of production force has been raised. The economic system in China has changed from a single planned economy to a merchandise economy. Socialist marketing economy has been gradually set up in recent 5 years. In this case, if the educational system, educational guided thoughts, educational pattern, educational methods would not be reformed; they could not meet the requirement of the socialist marketing economy. So educational reform must be carried on.
From the existing and developing of CEC, it is more urgent and important to reform. Because CEC is a kind of college that trains applicable engineering personnel and management personnel for enterprises. The enterprises have changed from production style under planned economy to production and management style under planned merchandise economy since reformation, further to management and production style suitable for socialist marketing economy. From the view of enterprise mechanism, it has changed from planned driving force to benefit driving force, now to marketing driving force. From the level of equipment technology of the enterprises, automation, program, and computer have replaced Manual operation. These changes of the enterprises require the relative changes and raising of the thought, quality, knowledge structure, technology of the enterprise operators, management personnel, engineering personnel as well as the workers. If CEC would not know these changes, it could not make teaching reform; the graduates CEC trained could not meet the need of the enterprises. The enterprises are the “users” of CEC, if the users do not welcome CEC, how could CEC exist?

The present situation of CEC education is much worried about. The students do not know what they should know, do not master what they should master. Nor do some teachers. As we know, the colleges should train qualified personnel for the society, esp. for the enterprises. Up to now, some leaders of the colleges are unwilling to walked out the gate of the colleges for understanding the society and the enterprises. Some teachers like to walk on the old “road” with old “shoes”. A kind of teaching material can be used for many years. The technology of the enterprises has been advanced rapidly. However, laziness and the wish to save trouble prevent some teachers from renewing their knowledge and their creation.

The enterprises need the qualified personnel urgently. There are 4,327 enterprises in Henan Province; the proportion of engineering personnel is less than 4%. The graduates of CEC should be badly needed. However, the fact is that CEC students can not find a job for about one or two years after they graduate. There are
two reasons for it. First, the students are unwilling to go to the units that need them (e.g., the enterprises in the county), they are rejected by some units in which they desire to go. Second, CEC students in enterprises, especially in the county-grade enterprises, go away within several years due to the bad living condition and less payment. So both the students and the society should be responsible for it. But the main reason is that the guided thoughts of the colleges are incorrect, the students have no high quality and they have no right view on finding a job. As time goes by, the students CEC trained are not welcomed by the enterprises. If the students are unwanted by the enterprises, the student’s resources of CEC must be exhausted. What will be the fate of CEC?

THE 2+1 PATTERN PUT FORWARD
In the face of this severe situation, what is the way for CEC? In August 1995, the leading group of HMEEC visited 7 well-operated colleges in Henan Province, learning advanced experiments from them; investigating 21 excellent enterprises; asking for opinions, suggestion and requirements from the factory directors. By investigation and study, the college decided to devise a way of running a cooperative college between HMEEC and enterprises.

In October 1996, the Board of Directors was set up between HMEEC and 34 medium and large backbone enterprises in Henan Province. In the process of cooperating with the enterprises, all the factory directors asked HMEEC to educate and train applicable personnel who have high quality, strong will and fit in with the society rapidly for them. When HMEEC was seeking for the new way of running the college, Mr. Wei Xiaoyu, Director of Jiaozuo Cable Factory, was worrying about being short of qualified technicians. He said to us: “If you can set up a cable specialty, recruit one class (40 students) each year, I guarantee to employ all the graduates for 10 years.” Moreover, he said: “We can train the students together: the engineers of our factory can give lectures to your students, the teachers of your college can practice in our factory, the students can have their lectures both in the college and factory.” Therefore, the 2+1 pattern came into being.

CONTENTS AND CHARACTERISTICS OF THE 2+1 PATTERN
The 2+1 pattern is that HMEEC applies to the State Educational Department for recruiting 40 students in accordance with the need of Jiaozuo Cable Factory each year. Being recruited by the State, the students study in HMEEC in the first two years, learning preliminary subjects and some specialties. They go to the factory for working (in the daytime) and studying (in the evening) in the third year. In the processing of practicing and working, the students choose their graduate design project, title of graduate paper. Finally, they return to HMEEC for graduate design and paper reply. After gaining the graduate certificate, they go back to their working station in the factory.

There are four characteristics of the 2+1 pattern. First, the direction, aims and standard for training qualified personnel are clear and definite. Second, the college education has close ties with the society, especially with the enterprises. Thus the cooperative education has essential contents and basis, so that the college education can really serve the production construction and meet the need of the socialist marketing economy. Third, the enterprises become the main body for running the college, increasing their participating consciousness, thus making the enterprises be active in college operations. Because from the beginning, the enterprises know clearly that the students will be their own employees in the future, so they pay more attention to the college operations as well as the quality of the students. Fourth, the students trained in this way can fit in with their work as soon as they come to the working station in the enterprises.

RECOGNITION OF CECE
1. CECE is the premise while education is the purpose. Education is the core and purpose, cooperation is a kind of means, formation and premise from the view of the proposition of CECE. CECE has been talked about for 20 years in China, but no outstanding progress has been made. Although there are many reasons—e.g., the problems of government guide, people’s recognition and view, and the lack of consciousness on crisis—the main problem is incorrect operation of CECE. From the view of operation, purpose is much emphasized; less attention is paid to the means. In fact, there is no real cooperation. The factory supplies just a practice site for the students. There are two main bodies of CECE. One is the enterprise; the other is the college. For colleges, it is rational for them to carry on education. However, for enterprises, there is no necessity for them to be engaged in education. The duty of the enterprises is to produce material wealth for the society, of course. Several enterprises that have keen insight regard producing “qualified personnel” as their duty. There is no benefit for the enterprises from the beginning years. Some enterprises are unwilling to do it. How to accelerate the enterprises to be active and willing enough to participate in CECE, training qualified personnel together with the colleges? My suggestion is: cooperation first and cooperative education second: this is the correct method. If you want the colleges and enterprises to make real cooperation, communication is very important. A bridge and a tie are needed. For instance, it is a better way to set up a board of directors between colleges and enterprises. By the formation of board of directors, the colleges and enterprises are united together. Mutual help and contact can increase the friendship and feeling with each other. This is the premise and basis for operating cooperative colleges and cooperative education. Therefore, cooperate first; then come up to cooperative education. Cooperative education is the result of relative levels and realms on cooperation. It is in half way for success when we realize it.
2. The aim of CECE is to train and raise the quality, level and ability of the students completely. The graduates we trained in the past were not welcomed by the enterprises due to two reasons. One was that the students could not fit in with their jobs as soon as they came to work. Another was
that the quality of the students was inferior. All the factory directors hope that the students they employed can play their role at once. In fact, the students (both graduates and postgraduates) spend a long time for fitting in with their jobs in the enterprises. The shortest term for fitting is half a year; the longest is more than two years. CECE takes it as their purpose to require the students to be adults and, at the same time, to obtain knowledge. The students are trained in college and enterprise so that they can have many teachers, friends, and learning objectives. This makes the students love their working stations, respect their teachers and friends before graduating. This purpose is in conformity not only with the demands of China education reform, but also with the demands of the enterprises.

3. There are two ways of realizing CECE. One is cooperation between one college and one enterprise. Another is cooperation between one college and several enterprises. Both can adopt the 2+1 pattern. However, the quantity for cooperative bodies and employing units is different, and the operating way is also different. Here we only discuss the common characteristics of the two ways.

a. Preparation for CECE in the Early Stage

• Choose the proper cooperative partners.
• Set up a leading organization for cooperative education by both parties.
• Sign cooperative intention by both parties (including cooperative purpose, significance, contents, methods, rights and duties, etc.)
• Establish the guided thoughts for cooperative education.
• Establish a clear and definite aim for cooperative education. (Who will employ the students? What kinds of students will be needed? When? How many students will be needed?)
• Draw up a program and project for cooperative education.

b. Implementation of Cooperative Education

• Establish the purpose of education and teaching.
• Set up a special teaching and research section.
• Compile the outline of education and teaching.
• Compile the program of education and teaching.
• Establish and compile teaching material.
• Organize the pre-stage education. (Organize the students to visit the college and enterprises within a week after they enter the college.)
• Implement education and teaching. (The students study and take part in some teaching practice at the college in the first two years; then go to the enterprises for working and studying.)
• Effect assessment. The leading organization of cooperative education will check the teaching management. Student management will comment on the test and examination in accordance with educational and teaching program. Each term some correcting suggestions for inadequacies are put forward. General assessment is carried on at the end of each year. Correcting suggestions and comments are given to the operation and have a positive effect on cooperative education.
• Reward and punishment. Set up scholarship on cooperative education. Excellent teachers and students will be rewarded; the inferior working personnel and students will be punished.
• Follow-up investigation and feedback. The colleges set up the graduate files. The files record the ability, achievements, and moral integrity commented on by the employing units, and record the suggestion and opinion on CECE from the graduates by their practice. The investigation is carried on twice in the first year after the students graduate. From the second year, it is carried on once a year. This follow-up investigation will continue for 10 years.

4. The operating mechanism for CECE is the function and formation that can accelerate something for normal operation. Formation is external; function is motive force, internal. Both combined together make the mechanism. The correct mechanism is needed for operating CECE normally. Here the motive force is mainly expounded.

• The motive force on demands. CECE is a kind of college that trains applicable personnel for the society. However, the modern enterprises do not welcome the students who graduate from CECE due to their inferior quality. At present, it is rather difficult for CECE graduates to find a job. This badly affects CECE recruitment. The reducing quantity for recruiting students will threaten the college existing. In order to exist and develop, CECE teaching reform must be carried on. The reform must distinguish application, forming characteristic. Therefore, the only correct choice is to cooperate with the enterprises, walking on the way of CECE. Enterprises, whether large or small, need qualified personnel, especially applicable, qualified personnel. For applicable qualified personnel have both theoretical knowledge and ability for operation, fitting in rapidly with the need of the enterprises. You can see the organic combination between theory and practice from them. Some graduates pay much attention to official career, having no confidence with the enterprises due to the incorrect guides of policies and public opinions. They leave away from the enterprises soon. The factory directors are very worried about that situation. In order to stabilize the technical backbone troops of the enterprises, the enterprises are willing to train qualified personnel on their own: e.g., sending their workers to the college for further education. On the other hand, with the slow reform of the education system and teaching, the students trained are inferior. The enterprises are very worried about that. CECE can solve these kinds of problems so as to meet the demands of the enterprises. Therefore, the enterprises should be active in cooperative education. Not all the enterprises can realize this. It needs
guidance from the government and public opinions. The college should try to gain the initiative.

• The motive force on benefit. Mutual benefit is the basis and premise for cooperation. It is one of the mechanisms on the motive force for CECE. Jiaozuo Cable Factory will pay RMB100,000 for a qualified graduate. It is very expensive for the enterprises. So they have to train the students on their own: i.e., the factory pays one student at least RMB 6,000 each year for tuition fee, accommodation fee, etc. It costs RMB 42,000 for each student within three years. However, one class (40 students) trained by CECE will save RMB 168,000 for the enterprise. For college, the enterprise supplies the second class for teachers, students and working personnel; it is a good chance for practice. At present, the youth teachers are emphasized to be trained as “double quality” personnel. They are teachers while giving lectures to the students; they are students while learning from the factory directors and workers in the enterprises. The graduates trained in this way are welcomed. Therefore, there is no problem for the college to recruit. The enterprises contribute much to teaching and laboratory construction for the college in cooperative education, improving the college’s operating condition and enhancing the college’s strength. In a word, the college gains many benefits from CECE.

• The tie of friendship. Confidence and friendship are the basis of CECE. The successful CECE can develop this kind of confidence and friendship between colleges and enterprises.

The way for CECE is definitely correct. The correct way must be wider and broader.