The DNM Cooperation Between Enterprise and College Based on Social Needs

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Abstract. A new cooperation of the enterprises and college model is presented in this paper. The new cooperation model not only avoids the dependent on the government severely, but also stimulates the passion of the enterprises in the cooperation between enterprises and college. The best features about the new cooperation model are leaded by the social need and employment of the multi-agents instead of the only college. The application results show that the educational quality has advanced obviously through the CNM cooperation between the enterprises and college based on social need.

Introduction

The higher vocational education plays an important role in higher education of China, which emphasized the technical ability instead of the studying theory or research knowledge. The higher vocational education can foster the technical workers needed by the companies [1]. The cooperation between enterprise and college is a significant model in the vocational education advocated by the government. The educational model makes the need of the worker in the enterprise connection with the vocational education, accompanying the seamless connection on the school and company for every student [2].

In this paper a new cooperation model between the college and enterprise is presented, which avoids the defects in the current cooperation. The best innovations of the new cooperation model are the driving mode has changed from the policy support to the market need and the leadership of the cooperation shifting from the college to the organization constituted by the college and enterprises.

This paper is organized as follows. In Section 2 provides the DNM cooperation between the enterprise and college based on social need. In Section 3, the results of the new cooperation model are shown. Section 4 concludes this paper and points out the direction for future research.

DNM Cooperation Based on Social Needs

The DNM cooperation between the enterprises and college based on the social need is an innovative cooperation model improved by the dynamic theory. The D means the dynamic, the N indicates the multi-agents and the M expresses the multi-levels. The DNM means dynamic multi-subjects and multi-aspects, in which multi-subjects indicate many companies which are changed from year to year, and the multi-aspects mean different aspects such as course building, teaching building and so on. The D in DNM means the dynamic adjustment of the main bodies in the cooperation.

Social Needs Guideline

The new model of the cooperation between enterprises and college emphasizes the effect of the social needs, which avoids the main shortcoming in traditional cooperation being overwhelmingly dependent on the government. The traditional cooperation in the enterprises and college is leaded by the government. Without the support policy coming from the government, the cooperation is unable to continue. The new guide model shifting from the government to the social need avoids the defect in the traditional cooperation. The social need can optimize the recruitment organization as a whole and point out the direction of the education in the college.
Stimulation of the Passion with the Company

The new cooperation model adopted the multi-agents instead of the only one advances the enthusiasm of the company to participate the cooperation. In past, the college is leadership and the companies participates the cooperation passively. The company cannot acquire the benefit including the monetary profit and the necessary worker resource, because the deciding power in the cooperation is in the hand of the school. The new cooperation with multi-agents makes the every participant possess equal status and promotes the enterprise to participate the specialty construction fully.

Dynamic Adjustment of the Enterprises

The market economy had been advocated by China for many years, which means the social resources allocation through the market. The development of the company needs to be adjusted by the market need dynamically and the manpower need of the company is different from year to year. The dynamical model makes the company decide whether or not to join cooperation every year according to the development plan of the company in the next year. The dynamical adjustment makes the main bodies in the cooperation keep the passion for the development of the company. The multi-levels cooperation would be changed according to the demands of new company. The dynamic model considering the development variety of the company enough makes the cooperation between the enterprise and college flexible.

Connecting the Education to the Position Demand with Seamless

The difference between the education and the need of the asset need to be resolved by the enterprise-and-college cooperation. The difference is not shortened through the cooperation, because the enterprises lack of the motive power in the past. The vocational college cannot cultivate qualified workers, if the education cannot arrive to the position demand in the vocational college. Based on the CNM model, the college and enterprises can achieve the multi-levels cooperation to shorten the difference. This multi-levels cooperation includes the specialty construction, course building, and textbook construction and so on.

Construction of the Specialty and Curriculum

Construction of the specialty and curriculum are finished by the teachers and engineers dispatched by the college and enterprises separately. According to the principle that specialty adheres to the working station, the teachers and engineers work together to choose the typical working stations on the trade. These stations are the service objects of the specialty and the working direction for every graduate on the specialty.
The construction of the curriculum is on the basis of the specialty construction. After the teachers and engineers analyze the chief requirements on the jobs together and choose typical examples on the work carefully, the curriculum system is designed by these typical examples or projects. The curriculum system includes the professional course, professional core course and the professional practical course shown in the fig 2. The construction of the teaching materials, projects case base and the material library should be finished by the teachers and engineers together. The specialists coming from the famous company or enjoying a certain reputation in relevant specialty can supervise or guide the building work in the process of the specialty and curriculum in order to guarantee the quality of the construction.

![Figure 2. Construction of the Curriculum and Specialty.](image)

**Examination System Creation**

Examination is a significant method to examine the study situation. Rich examination mode can not only inspect the study situation for every student promptly, but also promote the study enthusiasm on these students.

Three levels contest system created by the college-and-enterprise cooperation accords with the three year education model, in where the students take part in different contest in every year to investigate the study situation. The contest content connects not only with the knowledge learned by the students, but also with the station requirement in the company. The engineers coming from the enterprises take part in the full process of the examination and the relevant teachers are out of the emulation that guarantees the testing quality and fairness. Because the prize of the test decided by the enterprises and the testing result is relevant to the future work of the students in some extent, the passion of the participating the examination and the study can be advanced in the students.

**Mutual Employment Mechanism**

The difference between the ability of the teacher and the demand of the position in the company is a large question obstructing the teaching quality. Excellent teachers can educate the students with high-level ability, but these teachers without enough ability to satisfy the station demand are hardly to cultivate the excellent students. The company and college can enroll excellent engineers or teachers to satisfy the development requirement of each other. The company not only provides the station to satisfy the need of the teacher cultivation, but also dispatch some engineers with rich experience to undertake some practical lesson in the school. The teachers with excellent innovative ability can be employed by the enterprises to advance the scientific research or solve the bottleneck of the company in the development.

**Construction of the Training Room**

The practical condition is a significant element to educate students. If the practical resource cannot arrive to the demand of the company, the teaching quality is also decrease in the college.
There are two type of practical resource in the cooperation between enterprises and college. The one is the practical room in the college, another one is the training base out of the college. The practical room should be designed and constructed as the working station in the company in order to make the students study at the real working environment in the college. The training base provided by the company is to satisfy the different requirement in the practical process or in the course. Figure 3 shows the architecture of the practical resource in the college and the company.

**Result of the New Cooperation**

In the last three year, “Lanqiao” National Software and Information Technology Professionals Competition, Contemporary Undergraduate Mathematical Contest in Modeling and Tianjin Vocational Students Skills Competition. Table 1 shows the number of winners in contest in the last three years.

<table>
<thead>
<tr>
<th>Year</th>
<th>LanQiao</th>
<th>Mathematical Modeling</th>
<th>Vocational Students Skills</th>
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<tbody>
<tr>
<td>2015</td>
<td>6</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>2016</td>
<td>10</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>15</td>
<td>12</td>
<td>1</td>
</tr>
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After implement of the DNM cooperation based on the social need, the software technology in Tianjin maritime college has received social recognition, the number of students enrolled is growing at 48.8 per cent per annum. The concrete number of the students enrolled from 2015 to 2017 shows the fig 4.

From 2016, 70% of the students of the major in software technology are employed by the company in the CNM cooperation or more. The new cooperation is praised by the company and students.

**Conclusions**

The DNM cooperation between enterprises and college based on the social need is presented in this paper. The new cooperation model not only avoids the dependence of the government severely, but also ignites the passion of the enterprises by the multi-agents. From the result of application of the DNM cooperation, the educational quality and the ability of the teachers have advanced clearly.
References


