Innovation Ability Cultivation Evaluation Index System Study for Students Majoring in Logistics Engineering

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Abstract. This paper aims at studying the innovation ability cultivation evaluation index system for students majoring in Logistics Engineering in Beijing Union University. First the background for innovation ability cultivation of Logistics Engineering major is presented. Then the evaluative factors of innovation ability are analyzed. An Innovation ability cultivation evaluation index system is presented. And finally, the evaluation method for the index system is also discussed briefly. This paper provides a basis for students’ innovation ability cultivation.

Introduction

Modern logistics has become one of the fastest developing industries in recent years, which calls for an increasing number of talents majoring in logistics. In the process of transfer, upgrading and transformation of logistics industry, higher requirements for talent training are put forward. Modern logistics presents the characteristics of information, intelligence and engineering practice. The cultivation of innovative talents is an important way to meet the needs of diversified logistics talents. For colleges and universities, how to improve the quality of talent training has become an urgent issue, and innovative talent training has become the key to talent training in colleges and universities [1-2].

Beijing Union University has made more theoretical and practical achievements in the fields of discipline and major construction, applied talents training, and the research on the curriculum construction of applied specialties, in order to cultivate urban and applied talents suitable for the economic development of the capital. Since the establishment of logistics engineering major in 2010, it has conducted both theoretical and practical study on the cultivation of applied logistics talents, and gradually explored and developed the tutorial system. At present, the students of logistics engineering are equipped with a supervisor helping to cultivate their innovative ability. The forms of achievements include research papers, patents, competition awards and so on. In this process, the logistics engineering major has obtained some achievements, but has not formed the system training method and the evaluation index system. The evaluation index system is very important during innovative ability cultivation of students, which could evaluate the quality and effectiveness of the cultivation process and then drive the students’ creative practice [3].

This paper aims at studying the innovation ability cultivation evaluation index system for students majoring in Logistics Engineering in Beijing Union University.

Evaluative Factors of Innovation Ability

For students majoring in Logistics Engineering in Beijing Union University, innovative activities are participated by both the students and their supervisors, and are supported by the university environments. Referring to relevant policies of the university and the graduates’ and undergraduates’ cultivation experience [3-4], the evaluative factors of innovation ability include the innovative knowledge basis and learning ability, innovative thinking ability, and innovative practical ability.
Knowledge and learning ability are the basis for innovation. Besides the general education courses and specialized courses for knowledge basis, several courses aiming at cultivating the innovative learning abilities of students majoring in Logistics Engineering of Beijing Union University are opened, such as Methodology of Scientific Research for Logistics Scientific and Technology, Documents Retrieval, Special Topics on Operations, Research Operations Management of Logistics Service, Topics of Foundation of Computer Software Technology and so on. Besides, more than sixteen practical courses are also opened for innovative ability cultivation.

Students’ innovative activities are directed by the innovation thinking. Innovative thinking refers to the thinking process of solving problems with innovative and original methods. It includes logic thinking ability, divergent thinking, inspiration thinking, and imagination thinking. The innovative thinking ability can be cultivated through finding, analyzing and solving problems during learning and researching processes.

Innovative practical ability is the key factor to get innovative achievements. It mainly includes practical operating, problem solving, and innovation achievement transformation abilities. The innovative practical ability can be assessed quantitatively and very important for innovation ability evaluation.

### Innovation Ability Cultivation Evaluation Index System

Based on the theoretical and practical study during talents cultivation of Logistics Engineering in Beijing Union University, and by referring to other relevant studies [3-5], the evaluation index system of innovation ability cultivation is proposed as shown in Table 1. It includes three first level indexes and ten second level indexes. Each second level index has its own key factors and evaluation indications.

<table>
<thead>
<tr>
<th>First level index</th>
<th>Second level Index</th>
<th>Key factors</th>
<th>Evaluation indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovative knowledge basis and learning ability.</td>
<td>General education and specialized courses</td>
<td>General knowledge and logistics specialized knowledge</td>
<td>Course achievement</td>
</tr>
<tr>
<td>Innovative learning courses</td>
<td>Methodology of Scientific Research for Logistics Scientific and Technology, Documents Retrieval, Special Topics on Operations, Research Operations Management of Logistics Service, Topics of Foundation of Computer Software Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical courses</td>
<td>More than sixteen courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovative thinking ability</td>
<td>Logic thinking ability</td>
<td>Use concepts, theorems, formulas and so on to sum up and deduce</td>
<td>Qualitative evaluation</td>
</tr>
<tr>
<td>Divergent thinking</td>
<td>Break through the limitation of fixed thinking and fixed function, recombine knowledge and experience, and find out many new possible solutions to problems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspiration thinking</td>
<td>Solve the problem with new ideas and methods which come out instantly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imagination thinking</td>
<td>Do the research with imagination.</td>
<td></td>
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<tr>
<td>Innovative practical ability.</td>
<td>Practical operating</td>
<td>Practical operation ability during practice in courses, projects, enterprise practice, and the ability to achieve skill certification.</td>
<td>Course achievement, enterprise assessment and number of skill certifications.</td>
</tr>
<tr>
<td>Problem solving</td>
<td>Solve problems in scientific research project, subject competition and other research activities.</td>
<td>Number of projects and competition awards</td>
<td></td>
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</tbody>
</table>
Evaluation Method

There are many methods which can be used for evaluating the students’ innovation ability under the evaluation index system, such as analytic hierarchy method empirical method, weighted statistical method, fuzzy relation equation method and so on [3-6]. With the simple weighted statistical method, each first level index has a right which can be given by experts or by questionnaire survey, which are $w_1$, $w_2$, $w_3$ respectively. For each first level index, the relevant second level indexes have a total weight of 1, and each second level index weight can also been obtained by the same methods as the first level index. The second level index weight can be represented by $v_{ij}$ (where $i=1,2,3$, $j=1,2,\ldots,n$, $n$ is the number of second indexes relevant to first level index weight $i$). After quantization of the evaluation indication of the second index, the total score for each student’s innovation ability evaluation can be calculated.

Summary

This paper studied the innovation ability cultivation evaluation index system for Logistics engineering major in Beijing Union University, and proposes three first level indexes and ten second level indexes. The evaluation method is also discussed briefly. This study is the premise and basis for innovation ability cultivation of undergraduates of the major.

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References