Research on the Orientation of Undergraduate Tutorial System Based on the Bloom’s Taxonomy of Educational Objectives

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Abstract. The scientific and rational duty orientation of the undergraduate tutorial system plays an important role in exerting the function of the tutorial system and solving the problems existing in the implementation of the undergraduate tutorial system in China. This paper studies the orientation of the undergraduate tutorial system in the process of knowledge cognition by introducing the Bloom’s taxonomy of educational objectives. This paper first introduces the basic theory of the Bloom’s taxonomy of educational objectives, and analyzes the problems existing in the process of the existing Chinese undergraduate training mode to achieve the goal of Bloom education. On this basis, this paper points out that the undergraduate tutorial system should be positioned in the achievement of the higher level goal in the Bloom’s taxonomy of educational objectives.

Introduction

Since the reform and opening up, China's economy has made great achievements in the world. However, in recent years, China's economic development is also facing a series of problems. First, the economy is facing downward pressure, and external demand is weak. Second, the economic structure is unreasonable, mainly in labor-intensive manufacturing industry, as a result, China is at the low end of the global value chain. Innovation plays an important role in solving these problems. Nevertheless, the implementation of the innovation strategy should finally be implemented to the micro individuals. Only those who participate in economic activities equipped with the innovation ability can promote the smooth transformation of the economic structure. Undergraduate education plays an important role in cultivating high quality innovative talents. However, there are many problems in the traditional undergraduate education in China, for example, the interaction between teachers and students is less, which cannot be targeted at the students' personality and characteristics, and it is not conducive to the cultivation of innovative talents. To solve this problem, many universities introduce new training modes including undergraduate tutorial system to improve students' creative consciousness and creative ability.

Undergraduate tutorial system has been a topic of concern for education scholars at home and abroad. Liu and Wang (2013) pointed out that the undergraduate tutorial system was an important "key" to promote the quality of undergraduate teaching, which was conducive to the institutionalization of innovative talents [1]. He and Cai (2012) believed that the undergraduate tutorial system could cultivate students' critical thinking accomplishment through the way of "free education", which was of great significance to the construction of creative society [2]. Although the role of tutorial system is accepted in theory, the undergraduate tutorial system has encountered many problems in China’s practice. Hong (2015) believed that the undergraduate tutorial system was confronted with the dilemma in innovation and pioneering education due to the lack of self-consciousness of the tutor, the serious imbalance proportion of teacher and student and the lack of supervision and incentive mechanism [3]. Yan (2013) considered that there were some problems in China’s undergraduate tutorial system, such as resource scarcity, unclear system orientation and serious formalism tendency [4].

In conclusion, on the one hand, it can be seen that the existing research affirms the role of tutorial system in the promotion of innovative talents and higher education. On the other hand, it points out
that there are many problems in the practice of undergraduate tutorial system. The aim of this paper is to study the orientation of undergraduate tutor system in the perspective of the Bloom’s taxonomy of educational objectives. The following structure is as follows: The second part introduces the basic theory of the Bloom’s taxonomy of educational objectives; The third part discusses the necessity of introducing undergraduate tutorial system under the condition of Bloom’s taxonomy of educational objectives; The fourth part is discussion on the orientation of undergraduate tutor system; The last part is the conclusion.

The Cognitive Process Dimension of the Bloom’s Taxonomy of Educational Objectives

The cognitive process dimension of the Bloom’s taxonomy of educational objectives is hierarchical, which is divided into memory, comprehension, application, analysis, evaluation and creation. The specific meaning of the cognitive process dimension of the Bloom’s taxonomy of educational objectives is as follows.

First Level: Memory. Memory is the extraction of knowledge from long memory which is subdivided into memorizing and remembering.

Second Level: Comprehension. Comprehension means that people constructs meaning from teaching information in the form of verbal, written, and graphic communication which is subdivided into explanations, examples, classifications, summaries, inferences, comparisons or illustrations.

Third Level: Application. Application means that people executes or uses a program in a given scenario which is subdivided into execution and implementation.

Fourth level: Analysis. Analysis means that people decomposes the material into its constituent parts, determines the relationship between the parts, and the relationship between the parts and the overall structure or the general purpose which is subdivided into distinction, organization and attribution.

Fifth level: Evaluation. Evaluation means that people makes judgments based on criteria and standard which is subdivided into checks and comments.

Sixth level: Creation. Creation means that the elements can be composed of an inherently coherent whole or functional whole, which is then organized into a new model or structure. It is subdivided into production, planning and generation.

The Necessity of Introducing Undergraduate Tutorial System under the Bloom’s Taxonomy of Educational Objectives

Analysis of the Main Educational Modes of Undergraduates in China and the Degree of Protection to Bloom's Educational Goals at All Levels

(1) Traditional classroom teaching methods. Traditional classroom teaching method is the main mode of current undergraduate education in China. The low level memory and understanding dimension of Bloom's educational target classification, which is mainly cultivated by this kind of cultivation method, and this method is not very helpful to the dimension of higher education goal.

(2) Flip the classroom teaching mode. This mode takes students as the center, and pays attention to improve students' learning ability. However, due to the large number of college students in China, it is difficult for teachers to take into account the individual needs of each student, so it is difficult to cultivate high-level evaluation and innovation ability of students.

(3) Massive open online courses(MOOCs). Massive open online courses refers to a new way of education that transfers university courses across the world through the Internet to satisfy people's desire and pursuit of knowledge. The advantages and disadvantages of this approach are obvious, on the one hand, learners can arrange their own time and space to choose and learn related MOOCS. This class is both cost-effective and efficient. On the other hand, this approach is difficult to achieve efficient interaction. Low cost of participation leads to the low cost of exit, the curriculum completion rate is low in reality [5]. Thus, the way of MOOCS is helpful for the completion of the low-level educational goals, such as memory, understanding and analysis, while it is not very
helpful to the high-level educational goals that need to interact and pay attention to individual characteristics.

(4) Undergraduate research program. The undergraduate research program encourages students select designing topics, conduct the information analysis and write summary report and so on under the guidance of teachers. This program aim to cultivate students’ interests and abilities of putting forward questions, analyzing questions and solving questions [6]. This kind of training is helpful to the completion of high-level goals such as analysis, evaluation and innovation of students participating in these programs, however, it is not helpful to achieve the high level goal of the students due to the small number of students participating in the program.

(5) Innovative entrepreneurship training program for college students. The aims of the program are to promote universities transform their educational ideas, reform the mode of training talents, enhance training of innovative entrepreneurial ability, strengthen the innovative ability of college students and cultivate high level of innovative talents who can adapt to the needs of innovative country construction [7]. Like the undergraduate research program, the program has relatively small beneficiaries and is less helpful to the students' overall high-level goals.

Through the above analysis, it can be concluded that the existing major undergraduate education methods to the education goal of Bloom in the dimensions of the security is shown in the following table.

Table 1. The guarantee degree of the main educational methods of undergraduates on the goals of each level of Bloom's cognitive dimension.

<table>
<thead>
<tr>
<th>Bloom's Cognitive process dimension</th>
<th>Memory</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Evaluation</th>
<th>Creation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional classroom teaching methods</td>
<td>OOOOO</td>
<td>OOOO</td>
<td>OOO</td>
<td>OO</td>
<td>OO</td>
<td>O</td>
</tr>
<tr>
<td>Flip class</td>
<td>OOO</td>
<td>OOOO</td>
<td>OOOO</td>
<td>OO</td>
<td>OOO</td>
<td>O</td>
</tr>
<tr>
<td>MOOCs</td>
<td>OOOOO</td>
<td>OOOOO</td>
<td>OOO</td>
<td>OO</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Undergraduate research program</td>
<td>OO</td>
<td>OO</td>
<td>OOO</td>
<td>OOO</td>
<td>OOO</td>
<td>O</td>
</tr>
<tr>
<td>Innovative entrepreneurship training program for college students</td>
<td>OO</td>
<td>OO</td>
<td>OOO</td>
<td>OOO</td>
<td>OOO</td>
<td>OOO</td>
</tr>
</tbody>
</table>

Note: (1) The different number of symbol “O” indicates the degree of support toward the target, the more the number is, the greater the support level is. Five “O” represents a strongest support level, four represents strong support level, three represents a general level, two represents are weaker and one represents a weakest support level.

(2) This article focuses on the student's overall average level rather than individuals' level.

The Necessity of Introducing Undergraduate Tutorial System

According to table 1, it can be seen that the main education mode of the current Chinese undergraduates is generally weak in the level of the higher goals in the cognitive dimension of educational goals. Although there are some ways to pay attention to the cultivation of high-level goals, the guarantee to the high level goal of the students is not strong due to the small number of beneficiaries and they pay little attention to individual characteristics of students. So they can not guarantee the demand of the talents.

Undergraduate tutor have a long time to get along with the students in the undergraduate tutorial system, so the tutor is easier to understand the actual situation of the individual students. This system can provide guarantee for students' completion of high-level goals in the Bloom’s taxonomy of educational objectives. Therefore, it is necessary to introduce the tutorial system of undergraduates in the current undergraduate education in China.

Study on the Orientation of the Undergraduate Tutorial System in the Bloom’s Taxonomy of Educational Objectives

According to the reality of the current undergraduate training work in China, the tutor system in China should be positioned in the realization of the high level goal in the education goal classification of Bloom. Objectives of different levels should have different attentions. The specific content is described below:
Memory level’s goals. Because the traditional teaching methods have a good guarantee for student's memory level goal, the instructor does not need to spend too much time on this dimension. They can play the role of a facilitator and supervisor.

Understanding level’s goals. Since understanding is a critical step from knowledge retention to knowledge migration, mentors should spend more time focusing on this level of goals. Instructors can judge their understanding of knowledge by communicating with the students and guide them.

Applying level’s goals. The application is further on the level of understanding. The undergraduate tutor can provide the guarantee for the completion of the application level goal through the usual communication, the special seminar and the research of the project.

Table 2. The role of tutor system in undergraduates under the classification of Bloom’s taxonomy of educational objectives.

<table>
<thead>
<tr>
<th>Bloom’s Cognitive process dimension</th>
<th>Memory</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Evaluation</th>
<th>Creation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorial system for undergraduates</td>
<td>O</td>
<td>OO</td>
<td>OOOO</td>
<td>OOOOO</td>
<td>OOOO</td>
<td>OOOO</td>
</tr>
</tbody>
</table>

Note: The different number of symbol “O” indicates the degree of support toward the target, the more the number is, the greater the support level is. Five “O” represents a strongest support level, four represents strong support level, three represents a general level, two represents are weaker and one represents a weakest support level.

High level goals of analysis, evaluation and innovation are the goals of the cognitive dimensions of the undergraduate mentors who need to focus attention, and are the abilities that innovative talents should focus on. Analysis is a high-level application, that is, the ability to look at things from a systematic perspective, to deconstruct things, to better analyze the causes of the problem, and to determine the key factors of the problem; Evaluation means that students can use recognized rules or standards to judge questions, evaluate whether the goal is achieved and the appropriateness of the application of knowledge theory. Innovation means that students can put forward new assumptions, design new products or design new solutions to existing problems. The undergraduate tutor can cultivate these abilities through the way of special seminar, subject research and thesis writing. The undergraduate tutor has the advantages of long contact time and familiar with the individual situation of the students, so it has unique advantages in the cultivation of these abilities, which is not possessed by other undergraduate education methods.

In summary, it can be concluded that the role of tutorial system in the cognitive dimension of undergraduates based on Bloom’s educational target classification is shown in table 2.

Conclusions

In this paper, we have studied the position of cognition in the existing undergraduate tutorial system by using the Bloom’s taxonomy of educational objectives. The Bloom’s taxonomy of educational objectives is divided into six levels from low level to high level in cognitive dimension, and the existing education model is deficient in achieving the high level goal of the Bloom’s taxonomy of educational objectives. Based on the Bloom’s taxonomy of educational objectives and the situation of undergraduate tutorial system, the undergraduate tutor should pay more attention to the realization of the high level goal of the students' analysis, evaluation and creation.

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References


