

Research on Innovation of College Classroom Instructional Strategy from the Perspective of Deep Learning

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Abstract: Deep learning is an understanding and inquiry learning approach based on the development of higher-order thinking, which is of great importance to improve the quality of classroom teaching in colleges. This paper explains the connotation of deep learning for college students, and analyzes the shortage of current classroom teaching in Chinese colleges from the perspective of deep learning. It also puts forward the targeted measures as follows: establishing the teaching goal of promoting the development of students' higher-order thinking; refining the structured teaching content focusing on knowledge connection; innovating classroom teaching methods to promote students' cooperative inquiry; and adopting the multiple evaluation pointing to the development of students' ability.

Keywords: deep learning; college classroom teaching; teaching strategy

The classroom teaching level of colleges, as important places for talent training, directly affects the students' learning effect and the quality of talent training. According to Opinions on Deepening the Reform of Undergraduate Education and Improving the Quality of Talent Training issued by the Ministry of Education in 2019, "we should increase the degree of academic challenge, improve the quality requirements of talent training program, teaching process and teaching assessment, set the total amount of credits and the number of courses in a scientific and reasonable way, increase the time students invest in learning and the proportion of independent learning time, and guide students to read more, think deeper, ask deeper questions and practice hard". [1] However, there are still some problems to be solved in the classroom teaching in most colleges, and the cultivation of students' ability has not achieved the best effect, which cannot meet the needs of society for high quality talents. As an active, critical and meaningful learning style focusing on knowledge transfer and problem solving, deep learning provides a new perspective for college teachers to innovate classroom teaching models and improve teaching quality.

1. The Connotation of Deep Learning in College Students' Classroom

Deep learning has its root in machine learning in the computing field. In 1976, American scholars Ference Marton and Roger Saljo introduced deep learning into the field of education, and proposed the concepts of surface learning and deep learning for the first time in their paper Essential Differences in Learning: Results and Processes. [2] Biggs made a distinction between deep learning and surface learning according to the characteristics of both approaches. He believed that, different from memory and retelling of surface learning, deep learning aims at understanding, explanation, and critical thinking. [3] He also divided learning outcomes into five different levels from the lowest to the highest. [4] He Ling and Li Jiahou (2005) discussed deep learning in China for the first time, which opened the prelude to the study of deep learning by Chinese scholars. [5] Researchers have studied deep learning from multiple dimensions such as cognition, value, emotion and attitude, [6][7] and reached the following consensus. Deep learning is a kind of understanding and inquiry learning, with the participation of cognition, emotion, and attitude, based on the development of higher-order thinking. It is characterized by emphasizing understanding and criticism, information integration, knowledge construction, transfer and application, and problem solving. Based on this, deep learning for college students is a kind of learning in which they actively learn new knowledge under the guidance of teachers on the basis of understanding and

criticism, and integrate such knowledge into the original cognitive structure and then transfer them to the new situation, so as to develop their higher-order thinking and problem-solving ability. In a word, deep learning for college students belongs to the advanced stage of learning, and pursues active learning, knowledge construction, knowledge transfer, thinking development, and innovative problem-solving methods.

2. The Problems of Deep Learning-based Classroom Teaching in Colleges

2.1 Formalized, Segmented and Rigid Teaching Objectives

In the process of classroom teaching, teaching objectives are the guidance of teaching activities, and also point out the direction for students to achieve the learning results. The soundness and rationality of teaching objectives lay the foundation for students' deep learning, and the ultimate goal of deep learning is to develop students' higher-order thinking and problem-solving abilities. In the real college classroom teaching, the following problems exist in the design of teaching objectives. First, the teaching objectives are formalized, although they include knowledge and skills, process and steps, emotional attitude and values. However, in implementing these activities, teachers often lack of accurate grasp of the classification of the three-dimensional target and appropriate implementation, which become a mere formality, and the realization of most of the objectives are only superficial. Some teachers do not pay enough attention to the cultivation of students' critical thinking, nor treat it as an important teaching goal, and not to mention the development of students' higher-order thinking skills. Second, teachers overemphasize the achievement of students' knowledge and skill goals. They only pay attention to the knowledge capacity and progress of teaching content, and ignore the process and steps, as well as the cultivation of emotional attitude and values, which is not conducive to the formation of students' positive internal learning motivation. Third, teachers often consider the preset teaching objectives as the only standard, and fail to properly adjust them and create teaching contents according to students' interests and teaching opportunities in the process of teaching. Therefore, rigid teaching objectives failed, to some extent, to cultivate students' higher-order thinking.

2.2 Insufficient Connection of Teaching Content and Construction of Knowledge System

Teaching content is the link between teachers and students, which is directly related to what teachers will teach and what students will learn. Deep learning focuses on the integration of knowledge and students' understanding and internalization of new knowledge. Teachers' construction of teaching content affects students' knowledge processing degree and learning effect. Teachers have the following problems in content arrangement and knowledge construction. First, when arranging and constructing teaching content, they pay most attention to the structure of new knowledge in the course, while ignore the connection between teaching content and other subjects, which is not good to the construction of students' knowledge system. Second, they pay more attention to the connection between knowledge when selecting teaching content, and lack of analysis of students' existing experience, resulting in very shallow or very profound learning content. This is not contributing to students' establishment of connection between old and new knowledge, and affecting the learning effect. Third, the transfer of knowledge is not considered in the teaching content, and the connection between theory and practice is insufficient. Too much attention is paid to the teaching of theoretical or factual knowledge, and the design of procedural knowledge that can guide students how to do is very little. In a word, the lack of connection among teaching content and of the construction of knowledge system leads to poor learning effect and insufficient transfer ability of students.

2.3 Rigidified Teaching Approach and Superficial Cooperative Inquiry

Teaching approach is a guarantee for the realization of teaching objectives and tasks. The choice and application of teaching approach will affect students' learning style, as well as their

understanding and mastery of knowledge. Deep learning requires teachers to choose appropriate and diversified teaching approaches to promote students' active participation, active construction and cooperative exploration. However, in college classroom teaching, on the one hand, although teachers occasionally use case analysis, group discussion, task-driven and other approaches, they still mainly adopt the traditional instruction approach. This approach attaches great importance to the systematicness of knowledge, but lacks situation creation, interaction between teachers and students, and students' low interest in classroom participation, which cannot stimulate students' active thinking and active knowledge construction, and cannot cultivate students' critical thinking. On the other hand, due to most teachers focus on the instruction approach, ignoring the design of task-driven inquiry learning, they leave relatively less time and space for students to explore independently and cooperatively, which is harmful to the cultivation of students' thinking ability, analysis and problem-solving ability.

2.4 Unitary Teaching Evaluation and Insufficient Attention to Students' Ability

Teaching evaluation is the most important part of teaching activities, and also an important means to examine the effectiveness of teaching activities and students' learning effects. In teaching evaluation, there are mainly the following problems: first, teaching evaluation is relatively unitary. Although most teachers can gradually take both process and result into account in their evaluation, they still mainly focus on evaluating the result. Process evaluation is sometimes only a mid-term paper, which becomes a mere formality and is not useful to investigate students' learning process. Second, teaching evaluation does not pay enough attention to students' ability. Neither teachers realize the importance of students' self-evaluation, nor pay attention to the cultivation of students' self-reflection ability. In addition, the content of evaluation tends to examine students' mastery of knowledge and principles, without taking problem solving and practical abilities as important indicators of evaluation. Students get less feedback about ability development, which is not good for the transfer of students' knowledge and the cultivation of problem solving ability.

3. Construction of College Classroom Teaching Strategies Based on Deep Learning

3.1 Establishing scientific Teaching Objectives and Promoting the Development of Students' Higher-order Thinking

Teaching objective is the starting point and standpoint of teaching activities. The learning goal of deep learning is different from that of surface learning. The former pays more attention to the development of students' higher-order thinking. First of all, teachers should aim to promote students' deep learning and cultivate their higher-order thinking; conduct a comprehensive analysis of the learning situation, understand their existing level, find their zone of proximal development, establish scientific teaching objectives, and promote the development of students' higher-order thinking skills. Secondly, attention shall be paid to the systematicness of teaching objectives, combining the "three-dimensional" goals of knowledge and skills, process and steps, and emotional attitude and values. Instead of only focusing on cognitive goals, we should also cultivate students' process and steps, emotional attitude and values, so as to stimulate their internal drive of deep learning. Thirdly, attention should be paid to the combination of presupposition and generation of teaching objectives, seize the teaching opportunity to adjust the objectives appropriately according to the real-time situation of the classroom, stimulating students' interest and cultivating their high-order thinking.

3.2 Focusing on the Connection of Knowledge and Refining the Structured Teaching Content

The selection and arrangement of teaching content is a key factor for students to carry out deep learning. To achieve the goal of students' deep learning, on the one hand, teachers in the choice of

teaching content should not rely too much on the textbook; they should, on the basis of the teaching goal and the actual knowledge level of the students, pay attention to the correlation between the old and new knowledge and interdisciplinary knowledge, and process, supplement and expand teaching material, extracting structured teaching content. This content should have a certain breadth and depth, which not only conforms to the logical structure of knowledge, but also the cognitive structure of students, so that students can connect the new knowledge with the old, and internalize it into their own knowledge system. On the other hand, the design of teaching content should care situation creation, link theory with practice, apply what they have learned, and cultivate their ability of knowledge transfer and application.

3.3 Innovating Classroom Teaching Approaches and Promoting Students' Cooperative Inquiry

Teaching approach is the necessary auxiliary means to achieve the teaching goal. Each teaching approach has its advantages and disadvantages, as well as the situation and scope of use. In order to promote students' deep learning, teachers should innovate classroom teaching models and adopt appropriate approaches. First of all, teachers can adopt task-driven teaching approach and innovate teaching models based on the flipped classroom of micro class and MOOC, so as to stimulate students' enthusiasm for learning and improve their ability of independent learning and cooperative inquiry. Secondly, teachers can make good use of the advantages of information technology. Combined with pictures, audio, and video, they can present complex theoretical knowledge to students simply and visually, give students a full range of sensory stimulation, stimulate their interest, and deepen their understanding of knowledge. Thirdly, teachers should create a democratic classroom atmosphere and actively interact with students. In addition, teachers should also care about the effectiveness of classroom questioning, flexibly and skillfully design a variety of questions, so as to stimulate and diverge students' thinking, and construct their knowledge structure independently.

3.4 Using Multiple Evaluation Methods and Pointing to Students' Ability Development

Teaching evaluation is a necessary means to examine students' learning effect. It is an important feature of deep learning to cultivate students' awareness and ability to evaluate knowledge and its learning process, and to help students form correct values. Important gains in student learning come from providing students with frequent feedback about their learning, which can greatly enhance student learning when it focuses on the learning process rather than the end result.[8] First, teachers' evaluation should combine self-evaluation with evaluation of others, which integrates formative evaluation, diagnostic evaluation with summative evaluation, allowing students to have a correct understanding and reflection on their learning process and results. Second, in evaluating, teachers should focus on students' thinking quality, metacognitive ability and problem-solving ability, enhance students' self-efficacy and lead their learning to a higher level of deep learning.

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