Hierarchical Teaching Method of Civil Engineering Materials in Applied Undergraduate Colleges

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Abstract. With the development of higher education reform, puts forward new challenges and requirements for civil engineering in Local Applied Undergraduate Colleges of professional teaching work; and the number of college entrance examination gradually reduced, and the local undergraduate college students face severe pressure; at the same time to expand the scope of enrollment, the difference is not the same area of civil engineering students in basic theoretical knowledge individual student's quality and ability is larger, these factors make the traditional class teaching system facing the complex and grim challenges. Therefore, our research group in the teaching of civil engineering materials course in the process, with the reality of the students and teacher's teaching experience, optimize the teaching mode, to adapt to the needs of teaching reform in the new era of curriculum, the implementation of hierarchical teaching mode of "platform + module + team", improve the level of students' learning efficiency.

Introduction

At present, with the universities gradually expand the scope of the college entrance examination, students from the regional convergence for the evolution of divergent features, it also reflects more individual differences in students, which is composed of regional characteristics, students of the college enrollment pressure downward transfer resulting from the same batch of admission between individual characteristics and the distinctive style of learning [1]. Therefore, the traditional teaching methods and means often fail to achieve the desired teaching objectives, but many students feel that this course is boring and boring. In order to effectively organize teaching, improve students' learning efficiency, we must carefully grasp the individual characteristics and differences with the students, but also in the process of teaching through the application and regional characteristics of [2], and increase of students' initiative and in-depth cognition of the study and practice of the [3]: in order to study the learning the process, to stimulate their interest in learning, change their learning strategies [4]. With application as the main line, a new model of flexible and multi-level teaching should be established. Highlight the "life oriented" education and teaching ideas, and better meet the needs of student in different regions and different levels.

Classified Teaching Connotation

The so-called hierarchical teaching, students' knowledge structure system is based on the difference of basic theory, and considering the students' intelligence and other factors have obvious difference under the condition that the teacher follows the principles of individualized, conscious design of classroom teaching, experiment teaching, for learning instruction, homework for students at different levels to specific 'help', 'individualized test'. Enable each student to develop so as to achieve the overall teaching objective. Teachers should combine the actual situation of students, design a reasonable hierarchical goal, not only for good students to study, expand and extend, but also to keep up with the poor students. You should believe that every student can achieve his goal by his own efforts. Let all students through the hierarchical teaching, to better play its own potential.

In the process of teaching activities, the main task of teachers is to teach students to learn. "Teach fish rather than teach them how to fish."". The good student should encourage them to self-study, to implement the "development and innovation" teaching and learning content, at any time for doubts, the guidance of learning method, the key is to cultivate their professional knowledge learning ability, and discuss in the teaching activities, classroom teaching, give them the opportunity to "little teacher". For the students with low grades, we should carry out the teaching of "low starting point and basic", actively arouse their enthusiasm for study, strengthen the understanding and understanding of basic knowledge, and create conditions for improving their achievements. With the implementation and deepening of teaching activities, students' basic knowledge learning and innovative ability have been improved, so that students of all levels can get the corresponding development. Better realize the individual, highlight the main body, develop individuality, and foster the goal of innovation.

The Practice of Classified Teaching

Theoretical Teaching

From the 2010 level of civil engineering, we put forward the idea of student stratification, content stratification and multiple assessments, and implemented the teaching of the theory of engineering materials and experimental teaching at different levels. The students of a class are divided into three levels according to the actual level. The content of the course reflects both the basic and the essential. It also highlights the creativity and takes care of the needs of its own upgrading. Sue includes the following three aspects:

Divide the course content into different levels according to the requirements and degree of the syllabus: the three levels of foundation, mastery and improvement. The basic requirements prescribed for part of the syllabus, total hours 2/3; master part belongs to the basic requirements of the deepening of the content, total hours 1/3; improve the part is some advanced theories and problems in this course, or application is closely linked with real engineering problems.

In the teaching methods, for the basic part, collective teaching, and take selection, Jingjiang approach in the teaching process, in order to take care of the students of different levels; to master part, using "teaching methods focus"; improve the part, due to the less skilled students, but it has a higher knowledge and the ability level, so the main is to guide students to self-study, and the problem of teaching, encourage students to participate in the discussion, experimental design, to solve engineering problems.

In teaching assessment, the establishment of multiple assessment methods, and overall assessment of the teaching process. In the theoretical part of the written examination; experimental projects, mainly on their ability of operation and test report for the curriculum assessment; innovative experimental projects and planning project, mainly PPT defense, research report, quality papers, patents as assessment indicators. And listen to the feedback from students and correct the deficiencies.

In order to accomplish the content stipulated in the syllabus and to improve the ability of students at different levels with 2/3 hours, we have focused on the teaching of "basic" teaching. The method used is "select and talk"".

The teaching materials of civil engineering materials are numerous, involving concrete, cement, wood, steel, mortar, asphalt and other building materials. Therefore, our teaching group after discussion, carefully chosen to ensure the teaching content is the most basic and most important, by deleting unnecessary duplicate content; the teaching process to deal with the main contents and main content, similar to the relationship between the content, such as mortar and concrete. The essence is the careful research on teaching, in the classroom and experiment teaching, using heuristic teaching, the course content of "teaching" to the students, so that students in the premise of not to increase the burden on the mastery of the basic requirements, and make the students improve their ability. Our practice is: 1. from the beginning of the research object, clarifying the curriculum, so that students

know what to learn. 2. In the teaching content of each chapter, firstly the basic principle, clarifying the concept of. Second, it is necessary to discuss and discuss the common problems of different materials, such as gypsum, cement, lime, steel production and preparation. It is good for deepening students' understanding of basic concepts and developing students' lateral connection and thinking ability. The 3 Lecture Note inspired guidance, to enable students to learn some complex scientific and engineering problem is decomposed into basic knowledge of simple problems, and the introduction of appropriate classroom discussion, one achieved gradually.

Experimental Teaching

In the experimental teaching of civil engineering materials, we found the same requirements, learn at the same time, the same way of assessment, taking into account the basic theory of the students, and the demand for civil engineering materials are different, resulting in some students "food", and some students "indigestion". Therefore, the expected effect of the experimental teaching of civil engineering materials is not easy to achieve, and it will result in students' experimental foundation is not solid; the practical operation ability should not be effectively trained and trained. Therefore, the unified experimental teaching model is no longer suitable for the present two students to carry out experimental teaching.

The basic experiment with the experimental difficulty is low and the characteristics of less, is conducive to improve the confidence of students; comprehensive experiment mainly focuses on training students' practical ability, comprehensive use of knowledge; knowledge innovation ability and play design experiment is more focused on students. Taking into account the current individual differences and awareness of different students. According to the cognitive characteristics of students at different levels and the specific circumstances of the course, we use the "platform + module + team" approach to carry out the experimental teaching at different levels. The school of basic laboratory, innovation lab "platform", the theoretical basis for the students of different levels and different cultivation plan, set up three different modules, the content system of the "platform + module" of the experimental course of civil engineering materials, with different levels of the students study for the implementation of the "team" subject.

In the course of civil engineering materials experiment, we should follow the principles of teaching level and pertinence. Choosing the experiment items suitable for students can make students' professional characteristics, interests and hobbies be brought into play, so as to arouse the enthusiasm and initiative of students in their study. Not only can guarantee the quality of experimental teaching, but more importantly, it can also optimize the teaching resources.

Teaching Effect Evaluation

Since the implementation of layered teaching in civil engineering materials course for 3 years, obvious teaching effects have been achieved. In class, the students are able to participate in the discussion actively, actively ask questions, and in the course of the implementation of the teaching activities, from the initial put forward simple and simple questions to put forward thinking questions. You can not solve the problem, in the group of students can be conscious cooperation and communication, discusses how to improve; find the best solution and improve the students' comprehensive language expression ability and exchange ability, hands-on ability, reached a cooperation among students learning. Through the establishment of student-centered teaching mode, to study autonomous, cooperative, the main way of learning, pay attention to the combination of theory and practice, emphasizing teamwork, participate in various scientific research projects, the students' science and technology innovation plan form through the organization of students, let more students love "civil engineering materials" curriculum. Committed to civil engineering materials in the field of learning and research, and constantly improve the practice ability and cooperation ability of college students innovative design ability, and promote the harmonious development of students' knowledge, ability and quality.

1. Through the implementation of hierarchical teaching, improve the students' learning enthusiasm, so that all students learn, especially early learning difficulties of students' learning scores improved significantly, learning habits can be greatly improved. According to statistics, since the 2011 civil engineering students began to implement hierarchical teaching activities of civil engineering materials, the curriculum performance has been greatly improved, and the rate of failure has been greatly reduced.

2. In recent years, students are encouraged to register to participate in civil engineering materials at all levels of science and technology innovation program of college students and scientific research activities outside school practice, see Table 1, and achieved remarkable results, a total of 10 papers published in academic journals, 1 patent.

3. Students actively participate in extracurricular scientific research activities in practice, solve the technical problems of enterprises, enterprises have great sense of identity, in recent years there have been 5 concrete production enterprises, in the creation of school cooperative research base at the same time, the introduction of our school graduate students absorb hiring intentions.

4. Levels of teaching also enable students at different levels to better understand themselves, and further clarify the direction of their efforts, and constantly improve their professional skills.

Conclusion

School running orientation and characteristics of students based on "material" into the civil engineering curriculum teaching methods and methods for the proper adjustment and reform, in the classroom teaching and experimental teaching in the process of using the hierarchical teaching form, fully arouse all levels of students' learning initiative and spontaneity, and through induction, heuristic, problem methods to guide students to active learning. We should pay equal attention to both theory and practice, communicate and interact with teachers and students, and combine classroom teaching with project research in order to achieve the goal of improving students' interest in learning and comprehensive quality.

From the objective evaluation the final view of the teaching effect: the implementation of hierarchical teaching, 11, 12, 13 grade students learning achievement is not the implementation of hierarchical teaching, 09 students of Grade 10 grades have improved significantly; and in active reporting at all levels of College Students' scientific and technological innovation plan, teachers participation in engineering practice and technology research projects 11, 12, and 13 grade students are showing obvious enthusiasm. In addition, the problem of setting, classroom discussion, project research, problem solving and other comprehensive teaching, we can see that the learning ability of students have significantly improved, and in engineering practice, selection of material and ability to deal with the uncertainty problem is obviously improved.

Table1 In recent five years in civil engineering material course teaching effect assessment

Grade /students	test			College students' science and technology innovation plan	others
	The average scores	proficiency （>85），%	Don't pass，%		
2013/42	78.21	33%	0	4 (provincial)	The implementation of active learning mode
2012/51	73.01	20%	9.5%	2（provincial）	
2011/98	72.58	14.28%	6%	1（provincial）	
2010/128	68.02	5.47%	14.06%	0	Not been implemented
2009/85	69.37	9.41%	10.59%	0	

Problems and Reflections

As the current enrollment area is expanding, the practice of teaching at different levels has injected new vitality into the basic teaching of Civil Engineering Specialty in local applied undergraduate schools. But we also want to realize that: Teaching at different levels is a complex process of teaching, involving more problems.

1. Students' Ideological problems. Hierarchical teaching is carried out in class, with students' achievement as standard. Students with backward grades tend to be frustrated and students who have good grades tend to be complacent. Therefore, ideological education and management should be strengthened. And clear to students of hierarchical teaching is not artificial but only for marking, teach, play their respective strengths. To create a good learning environment, provide improvement chance for each student.

2. Textbooks, teaching requirements that meet the requirement of all the students in common, also want to consider the different levels of the individual needs of students and enhance the space, so we need to carefully select appropriate teaching materials, teaching content.

3. Teacher problems. Teachers are required to change their teaching concepts and methods, explore more suitable teaching materials for students, adapt to the new normal model, understand students and guide students.

All of these need further study and exploration in order to solve them.

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