Discussion on teaching reform of environmental planning and management

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Abstract: The curriculum of environmental planning and management is an environmental engineering major curriculum established by the teaching steering committee of environmental science and engineering of Education Ministry, which is the core curriculum of Chinese engineering education professional certification. It plays an important role in cultivating environmental planning and environmental management ability of environmental engineering major. The selection and optimization of the course teaching content of environmental planning and management were discussed which including curriculum teaching content updating and optimizing and teaching resource system construction. The comprehensive application of teaching method was discussed which including teaching method synthesis and teaching method. The final combination of the assessment method was also discussed which including the formative assessment normal grades and the final result of the course examination. Through the curriculum comprehensive teaching reform, students' knowledge had been broadened, the subject status and autonomy of learning had been enhanced, students' learning interest had been motivated, the ability of students' finding, analyzing and solving problems had been improved. Students' innovative ability and positive spirit had been well cultivated.

1. Introduction
As the national quality education advancing, higher education is not only to cultivate students' basic literacy and impart professional knowledge but also to tape students' innovative potential, inspire students' creative mind and cultivate students' innovative spirit. With the increasing importance of ecological environment protection in China, the innovative development requirements were put forward to the training of environmental engineering talents in colleges and universities. It needs the innovative ability in environmental planning and environmental management in order to cope with the shortage of resources and the pressure of the fragile environment in China. Therefore, it is necessary to continuously improve the environmental planning and environmental management innovative ability of environmental engineering students. The curriculum of environmental planning and management is an environmental engineering major course established by teaching steering committee of environmental science and engineering of Education Ministry, it is also the core curriculum of engineering education professional certification in China. It concerned with the basic knowledge of environmental policies, regulations, systems, standards, environmental planning, ecological planning and environmental management. It was beneficial to enhance students' consciousness of sustainable development in the training of environmental engineering major, and it was also beneficial to cultivate students' environmental planning and management innovation ability and basic quality.
In teaching process, it was well worth exploring and researching on how to get rid of the influence of traditional education mode and to innovate curriculum teaching mode to adapt to the quality education and innovative talent training needs. The teaching reform of environmental planning and management was discussed which including an optimized selection of teaching content, comprehensive application of teaching method, and reforming innovation of assessment method.

2. Selection and optimization of teaching content
Teaching content refers to the dynamic generation of materials and information that interacted with teachers and students and served the purpose of course teaching. It mainly came from the comprehensive processing of course content, teaching material and teaching practice. It generally included knowledge, skill and attitude. The selection and optimization of teaching content in this paper involved knowledge and skill. In order to promote students' knowledge and broaden their knowledge, it should optimize and update the content of course teaching through enriching new policies, new systems and new methods of environmental planning and management. At the same time, in order to cultivate the students' innovative ability, we penetrated transverse environmental planning consulting project achievements into classroom teaching to guide students to master the environmental planning content and method, it benefited for improving students' ability to analyze and solve problems.

2.1 Curriculum content updating and optimization
The curriculum of environmental planning and management was a highly applied curriculum. Its teaching content needed to keep pace with the times, which fully reflected the major environmental policies and environmental protection strategies of the state and society at the present stage. Therefore, in the process of teaching, it need pay close attention to the environmental problems which were widely concerned by all sectors of society, and carry out the specific cases to the course teaching content[1]. So we updated the teaching contents, revised the teaching outline and organized course teaching scientifically around environmental protection strategy, technological methods and policy system of country environmental planning and management. The curriculum integrity and each chapter basic knowledge were linked organically by systematically considering the organization and integration of each chapter content and basic knowledge points through selecting the teaching content and arranging knowledge points. It played emphases on the combination of tradition and modernity and the combination of basic knowledge and hotspot issues. It also paid attention to the development trend of the cutting-edge planning technology and management method while preserved the classical knowledge. In order to update the students' knowledge system in time, we brought the latest development achievement of the new technology, new methods, new policies and new system of environmental planning and management (such as environmental taxes) into the teaching content. At the same time, in order to broaden the students' major view, we infiltrated our scientific research results of curriculum group teacher into classroom teaching. That included the environmental planning transverse project, such as urban environmental planning, industrial ecological planning, ecological county construction planning, ecological town construction planning and ecological civilization construction demonstration area planning, etc. It also included the government's environmental management policy consulting projects, such as ecological protection red line management, regional environmental management, project environmental management, cleaner production audit, etc.

2.2 Curriculum teaching resources system construction
The construction of teaching resources was an important part of curriculum construction. We focused on the combination of environmental protection strategy hotspot on the environmental planning and management and the consulting projects undertaken by our teachers. The curriculum case library was established by compiling case study of environmental planning and environmental management. It mainly included the water environment planning and management cases, atmospheric environment planning and management cases, solid waste planning and management cases, noise pollution control planning cases, ecological environment planning and management cases, city environmental planning
and management cases, rural environmental planning and management cases, ecological industry planning and management cases. So it constructed a three-dimensional teaching resource system such as textbook teaching materials, case study materials, electronic courseware, questions bank (database), items bank, electronic books and online courses.

3. **Comprehensive application of teaching methods**

3.1 **Totalization of teaching methods**

Teaching method referred the general term for the manner of conduct in teaching activities that teachers and students realized teaching purpose and mission requirements in the teaching process. It is the unity of teaching method and learning method. Teaching methods included teachers’ teaching method and students’ learning method. The teaching method based on the learning method, otherwise it would not achieve the desired goal for lack of pertinence and feasibility. With the further advance of engineering education professional certification, the teacher-oriented teaching method was gradually transferred into student-centered and student-oriented learning method. Therefore, the curriculum of environmental planning and management was as the core curriculum of environmental engineering professional certification, it was necessary to innovate the teaching methods, apply various teaching methods and improve the teaching quality. Various teaching methods were comprehensively applied, such as case teaching, heuristic teaching, discussion teaching, inquiry teaching and participatory teaching. It stimulated students' enthusiasm for learning. At the same time, let students participate in the exploratory discussion of environmental planning consulting projects in order to cultivate students' independent thinking ability and creative thinking.

Case teaching had become an important teaching method in recent years and had been more and more applied in teaching. It was a simulation or reproduce some real scene in real life to let students place themselves into the scene. It had the experience, instructive and practical through teacher explanation and teacher-student discussion which let students master the professional skills and knowledge theory[1]. The curriculum mainly applied case teaching method, while interspersed with discussion method and inquiry teaching method. Diversified case teaching organization was adopted to improve students' understanding and application of professional knowledge. The first was to guide the self-study. Some relevant thinking questions were listed after learning the content of planning and management in an environmental factor, students were assigned to read the case materials in the textbook or reference books and asked to write a case study report. The second was classroom discussion. In order to cultivate students ability to analyze problems, We provided students some case materials and guided students to analyze a case study and prepare for the discussion, then students discussed and debated after student's group had finished analysis scheme. The third was interpretation analysis. In order to make students master the procedures and methods of environmental planning and understand the provisions of the environmental management, a specific environmental planning or environmental management case was also analyzed in the course, and students were guided to think about it by asking some questions at the same time[2]. It could combine theory and application of environmental planning and management, textbooks knowledge with case analysis, training objective with knowledge system, course practical with innovation through the case teaching. It was good for arousing the students' interest in learning and improving themselves able to find, analyze and solve problems. It was a benefit to cultivating students' innovative ability and practical spirit[3].

Participatory teaching was a kind of teaching method that made students become a principal position in the education teaching life. Students were encouraged to participate actively and learn creatively through themselves active participants in the form of "Taking Class" teaching activities. Firstly, let students take part in teaching course of environmental planning and management. There were some teaching contents of relatively simple, relevant to the practical and helpful for students work, such as environmental management system, urban and rural environment management, they were taught in groups by students lecture. All members of each group would discuss together, find relevant materials and make courseware. Students in groups made a lecture on the stage after the
courseware was examined and approved. Then students in other groups could ask questions to the group's students who made the lecture. At last, the teacher commented and made full affirmation the good part students. It could train students' office software ability and team spirit, it also could improve students' comprehensive quality. Secondly, let students participate in some projects of environmental planning and ecological planning. Students seriously participated in every link of field survey, data collection, panel interview, writing a report, text drawing and replying to report by participating planning projects in scientific research. It can make up for the deficiency in classroom teaching and deepen students' understanding of relevant planning knowledge through students participating in the whole journey of planning projects job.

3.2 Flexibility of teaching pattern
In-class theory multimedia teaching was a priority and the extracurricular practice teaching was auxiliary. In order to improve students' interest in learning, the flexibility of teaching patterns was applied which included case teaching, group discussion, inquiry exploration, Participated and mutual action teaching and so on. In order to cultivate students' ability to acquire professional knowledge actively, students need to finish the project of environmental planning and management after class through increasing the training content of extra-curricular practice and strengthening the training course professional skills. So the curriculum teaching mode of the multilevel and comprehensive was formed combining in-class with after-class, theory with practice.

First, the special training exercises were assigned in class that was not limited to teaching materials. After class students were required to seek answers through finding information that combined with national environmental planning technology, environmental management policies and regulations. Second, the group discussion and the special topic inquiry held in the classroom. let students mutually evaluate each others' solutions of special topic training homework of environmental planning and management. In the classroom, students were guided to think positively to discover the new question continually and seek the new answer. Thus gradually stimulated the student's innovation consciousness and raised the students' critical and creative thought. Third, the related special topics of the curriculum in scientific and technological innovation thinking training were a layout that combined with professional environmental technology and innovative thinking training practice in order to pay attention to innovative entrepreneurial knowledge and skills training. Students participated in the inquiry learning of environmental planning and environmental management consulting project of teachers group to cultivate students' scientific research consciousness and innovative ability.

At the same time, the modern education technology teaching of the network was flexibly used to innovate the teaching means of the course and promote the extracurricular interaction between teachers and students. It can cultivate the students' thinking ability, practical ability, communicative ability, expressive ability, team spirit and innovation spirit. The core of the interactive theory teaching was to transform the teacher-centered classroom into a student-oriented classroom. A simple classroom interaction changed from teacher questioning into a flip class by students. First, some questions were laid in the classroom that not only close to the production and living reality but also strong application. For example, what had the main environmental problems in their own home in the rural or urban areas? How to achieve effective planning and management in the rural or urban environment? How to resolve haze weather and keep APEC blue? How to create your city as a model city for environmental protection. Students were questioned from all angles and different levels and open mobile phone online to search for relevant answers students in the classroom. It can not only avoid students playing the phone in class but also give students a period of contacting with the mobile phone. It can also let students in the classroom learn happily in the process of using the phone and realize the teaching purpose in the relaxed joyfulness to mobilize the enthusiasm of students to participate in teaching. Second, the teaching materials were enriched that related to the content of classroom teaching through the schools’ network teaching platform, such as the relevant teaching materials of the resources sharing course and the excellent online open class of domestic environmental planning and management curriculum, as well as the related textbooks, cases and exercises of environmental planning and
management. Students can browse and study after class. When they find a problem, they can look for materials to solve or solve together in the next class with students or teachers. It can exercise students' innovative thinking ability.

4. Ordinary and final combination of examination method

The curriculum of environmental planning and management was not only a professional course but also a strong practical course. Therefore, the course examination should not only understand the students' mastery of the basic theories but also examine their ability to solve the practical problems by using their knowledge. At the same time, it should take the students' learning performance at ordinary times into account[6]. Therefore, it was necessary to change the past a single and fixed assessment mode by reforming the way of curriculum assessment. The new assessment form was replaced with the equal attention to the normal process assessment (accounting for 50%) and the end final assessment (accounting for 50%) and the traditional assessment form was abolished with final examination grade (about 70%) and ordinary grade (about 30%). It could avoid the disadvantages of the traditional termination of the evaluation. The course overall examination was designed that combining the professional knowledge examination with the innovation ability appraisal. The professional knowledge examination was the main part (accounting for 50%). The students' innovative ability were evaluated, students were required to submit in the form of the curriculum paper (accounting for 20%) that aimed at the controversial inquiry question to exercise the students' writing ability of scientific research paper. At the same time, a formative evaluation evaluated ordinary grades comprehensively were carried out according to questions and answers in the class and case discussion (accounted for 15%), and extra-curricular training (accounting for 15%).

4.1 Formative evaluation of the ordinary grade

The ordinary records was graded on the appropriate assessment criteria and the accordance of students taking part in the teaching activities that include the students' attendance, interactive lectures initiative, the completion of the project planning, case study participation, class discussions and answers, the level of course essay, the completion of classwork, etc.

4.2 Course exams evaluation of the final grade

The test A and test B two sets of papers for the final course exams were taken out that based on syllabus and innovation and entrepreneurship reform. The examination papers would be taken by the department and the school, then the papers were reviewed to score the results by the lecturers based on the grading standards and reference answers. The test papers were analyzed after the assessment of the final exam results. It needs to summarize the difficulty of the test and the score of the students' answer, find out the existing problems and analyze the reasons, then propose some measures or programs for future improvement[3]. The students' ability of independent study and innovation and entrepreneurship were improved through the improvement of innovative curriculum assessment methods that made the use of formative evaluation and combined with professional knowledge assessment and evaluation of innovative ability.

5. Conclusion

The curriculum of environmental planning and management is a required curriculum for four-year undergraduate environmental engineering major in our school. It plays an important role in cultivating the environmental planning and environmental management ability of environmental engineering professionals. Through the selection and updating of teaching contents, the students' knowledge system was updated and broadened, the students' cognition of new knowledge was promoted, and the students' professional horizons were expanded. Through comprehensive application of teaching methods such as case teaching, heuristic teaching, discussion teaching, inquiry teaching and participatory teaching, the dominant position of students' learning was given full play to their initiative, students' interest in learning was stimulated, the abilities to find, analyze and solve problems of
students was improved, students' innovative ability and positive spirit were cultivated. Through the combination of the ordinary grade and final examination assessment, students had changed from passive learning to active learning and paid more attention to the usual autonomy learning to achieve the unity of mandatory learning and autonomy learning. At the same time, students were liberated from the traditional rote memorization role and were focused more on analyzing the theory and solving practical problems encountered in the work. The students' ability were trained with solidarity and cooperation, language expression, literature review, innovation and entrepreneurship.

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