

Thoughts on the Practical Teaching Reform of Ecology Major in the New Era of Ecological Civilization

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Abstract: Ecological civilization construction is an important part of China's "five-in-one" construction goal, and ecology teaching is an important highland for the promotion and construction of ecological civilization. However, the employment of ecology professionals in China is not ideal at present. On the basis of analyzing the problems faced in the training of ecology professionals, this paper puts forward some ideas for the reform of the practical teaching of ecology undergraduate majors in view of the weak link of practical teaching, aiming to provide the innovative training of students and the construction of ecology majors.

Keywords: Ecological Civilization; Ecology Major; Practice Teaching Reform.

1. Introduction

As an important branch of the discipline of life support system, ecology mainly studies the structure, function and dynamics of macroscopic living systems. Ecology is not only the basis for human beings to understand nature, but also provides the theoretical basis and solution for human beings to protect and utilize nature, which is the scientific connotation of ecological civilization construction. With the increasingly severe situation of the earth's environment and human society, ecology has gradually become a leading discipline in the fields of climate change, human development, carbon peak, carbon neutrality, and biodiversity conservation. Especially since the 18th National Congress of the CPC, "ecological civilization construction" has been included in the Constitution and the Party Constitution, becoming a national policy and a millennium plan. In the 20th report of the CPC, strategic tasks and major measures to promote ecological civilization construction have been deployed, so the demand for ecological talents has become increasingly strong.

In 1977, under the auspices of Academician Li Bo and with the approval of the Ministry of Education, Inner Mongolia University established the first ecology undergraduate program in China. By 2023, universities have opened 89 ecology undergraduate majors. In order to strengthen the training of ecological talents, the Academic Degrees Committee of the State Council, in the newly revised Catalogue of Academic Degrees Awarding and Talent Training (2019), upgraded ecology from the second-level discipline to the independent first-level discipline, which shows that the country attaches great importance to the training of ecological professionals. The report to the 18th National Congress of the Communist Party of China clearly proposed to vigorously promote the construction of ecological civilization, which provides a broader prospect for the development of ecological professionals. However, in recent years, the employment of ecology professionals in China is not ideal. With the undergraduate major of ecology as the research object, the employment status in 2022 and 2023 is investigated and analyzed. The results show that the employment situation of ecology majors is not optimistic, and the brain drain is increasing year by year. Therefore, on the

basis of analyzing the problems faced by the training of ecology professionals, this paper puts forward some ideas on the reform of practical teaching of ecology undergraduate majors in view of the weak link of practical teaching, aiming to provide reference for students' innovative training and the construction of ecology majors.

2. Situation Analysis

2.1. Inaccurate Positioning of Talent Training

Most universities in China will ecology undergraduate professional personnel training in: cultivate a comprehensive grasp of life science, environmental science and ecology basic knowledge, basic theory and basic skills, ecological basic research and applied research scientific thinking and scientific experiment training, with modern ecology basic theory knowledge and solid experimental skills, familiar with the present situation of ecology, frontier and application in the production practice, to meet the actual needs of our country economic construction, moral, intellectual, physical all-round development of professional talents. However, the reality reflects the lack of reasonable positioning of ecology undergraduate majors. First, the four-year study of undergraduate students should obtain knowledge and ability positioning, which is not closely related to social development and demand, especially in meeting the needs of the job market, which needs to be in-depth analysis. Second, it does not give full play to its own characteristics and advantages in the positioning of undergraduate training, and falls into the embarrassing situation of "education without characteristics and students without special skills". Third, the long-term emphasis on theoretical teaching, the students' innovative practice ability training is obviously insufficient.

2.2. Deficiency in Teaching

Due to the inaccurate positioning of ecology undergraduate talent training, there are problems such as unreasonable curriculum setting and repetitive teaching content. Such as in the curriculum, covering all ecology, including molecular, individual, population, community, ecosystem and landscape ecology different scale ecology content, but the lack of system curriculum system construction, makes the course teaching

content appeared more repeated, seriously affect students' interest in learning. At the same time, too much attention is paid to the scientific research of ecology and ignores the practical application needs of the society, resulting in narrow employment channels and weak matching for undergraduates majoring in ecology.

2.3. Weak Teaching Resources.

Ecology is a very comprehensive major, but the undergraduate experiment and practical teaching has not attracted enough attention, the experimental course is less, the teaching content is old, advanced precision instruments of ecology have not been introduced into undergraduate practice teaching. In addition, some young teachers are just out on the platform, a little "on the duck", teaching experience is insufficient; some backbone teachers also because of other heavy tasks and "willing but not enough", into the teaching work energy, can not timely update their knowledge reserve. These lead to the students' professional knowledge is superficial, the professional knowledge structure is not systematic enough, and even there is a blind spot.

Since 2020, I began to undertake the ecological monitoring and evaluation, "restore ecology", "landscape ecology", "applied ecology" and other courses teaching tasks, try to cultivate the classroom teaching ability around the core organization teaching and arrange teaching activities, through teaching, learning, practice each link, let the students master the method of learning and work. Positive response and widespread recognition from numerous student feedback.

3. Reform Content, Objectives and Key Problems to be Solved

3.1. Reform Content

The key to the practical teaching reform of ecology undergraduate major is to cultivate students' innovative spirit, innovative ability and ecological literacy. Therefore, we should adhere to the student-centered approach, combine teaching content with social needs, combine ecological literacy with personal positioning, and combine teaching with scientific research. Therefore, it is planned to conduct research in the construction of practical curriculum system, teaching resources and practical platform, so as to promote the connection between inside and outside courses, the combination of industry, education and research, integrate professional education and comprehensive education, and explore the practical teaching mode in a multi-level and open way.

1) Construct a practical curriculum system with theoretical teaching. The practical teaching system of traditional ecology undergraduate major includes three aspects: professional basic experiment, field comprehensive practice and graduation thesis. First of all, the curriculum system reform complies with the coordinated development requirements of "knowledge, ability and quality" of cultivating innovative talents, and constructs the "five links" professional practice curriculum system including curriculum experiment, curriculum practice, professional comprehensive practice, social practice and second class, and graduation thesis practice (design). In pu'er institute of ecology professional practice teaching reform, for example, 3 + 1 ("3" refers to three years of campus learning, "1" refers to a year in Xishuangbanna tropical botanical garden, Chinese Academy of Sciences for practice and graduation thesis) training mode,

is the cultivation of the college, but there are still course experiment, course practice teaching content repeated phenomenon. First of all, some basic professional courses and professional courses are arranged in the same academic year, to avoid the repetition and simplicity of teaching content, and to carry out comprehensive practice in the summer vacation. For example, the botany, zoology, soil science and general ecology are integrated into "ecology experimental research methods and techniques", mainly to enable students to combine the basic theoretical knowledge learned in class with nature, and systematically understand the mystery of forest ecological science and field survey technology; to combine pollution ecology, restoration ecology, applied ecology, ecological monitoring and evaluation, mainly to enable students to understand the pollution ecological process and clarify the ecological monitoring and restoration methods.

2) Improve and standardize the practice of teaching content and methods. The current situation of "soft", "empty" and "extensive" in the practical teaching of ecology major is changed to "hard", "real" and "deep", and the cultivation of students' comprehensive application ability and innovation ability is strengthened. According to the ratio of 2:2:1, the practical teaching content is divided into basic experiment, comprehensive design experiment and research analytical experiment at three levels.

Basic experiments are mainly some verification experiments, generally based on the determination of single indicators, such as plant biomass, soil organic matter, soil pH, etc. In the experiment process, the teacher first explains the experiment items, experimental principles, operation steps and matters needing attention, and then guide students to complete the experiment. Students can deepen their understanding of the basic theory, and master the collection and treatment of plant, soil and water samples, as well as the conventional chemical analysis methods and operation norms.

Comprehensive experiment is the expansion and extension of basic experiment. In addition to the need to determine multiple analysis indicators, some other related course knowledge points together. First, the lecturers put forward a theme, and then discuss with the students, and finally determine the comprehensive experimental project of related topics —, such as urban forest precipitation water quality research. The experiment included the determination of atmospheric precipitation, penetrating water after forest crown interception, trunk and stem flow, that is, the monitoring point, the collection and preservation of water samples, and the analysis and determination of water sample indicators (pH value, dissolved oxygen, conductivity, ammonium nitrogen, nitrate nitrogen and sulfur). Through this process, students can combine the relevant knowledge points in "Forest Ecology", "Pollution Ecology", "Environmental Monitoring and Evaluation" and other courses, analyze the measurement results, and complete the research report. Students usually pay attention to some hot topics and scientific research interest in related subjects, so that students play a prominent role in the main body in the experiment process, and improve students' ability to comprehensively analyze problems and develop theory with practice.

Research experiments were carried out together with the graduation thesis. Students choose the scientific research topic, after the topic is determined, students first collect the literature under the guidance of the teacher, after the literature reading, design and determine the experiment plan, and then

carry out analysis and measurement, measurement results use SPSS, EXCEL and other software for statistical analysis, to complete the graduation thesis. Through this process training, students can have skilled literature retrieval skills, learn to use relevant software, learn to encounter problems, search literature, refer to the methods and results of other researchers in the same field, so as to find solutions to scientific research problems. Strengthening students' understanding of scientific paper writing, training their logical thinking ability, communication ability and innovation ability are of great benefit to their future study and work.

3) Implement the credit system reform, implement the "lifetime one policy", and strengthen the training of innovative talents. The undergraduate tutorial system is a new analysis of the education reform in response to the challenge of quality education, and the implementation of the undergraduate tutorial system is also an important measure taken by colleges and universities to strengthen the training of innovative talents. The basic contents of undergraduate tutorial system include: two-way selection between teachers and students; communication; selection of students in scientific research. Students combine with the tutor's scientific research project to apply for provincial or university-level college students' science and technology innovation project, college students "Challenge Cup" competition and other activities, and form a scientific research team with graduate students to enter the scientific research work as soon as possible, so that college students can get the tutor's "academic care" earlier, stabilize professional ideas, and formulate academic development plans.

4) Create a high-quality and efficient experimental platform. Relying on key laboratories and other platforms, according to the new practice teaching system, it provides a multi-level and multi-form practice platform for cultivating students' innovative spirit and comprehensive application ability.

3.2. Reform Objectives

Through the implementation of this teaching reform project, we try to build the "theory + practice + ability" three-dimensional teaching mode, and through the practice demonstration, reform the existing professional experimental curriculum system, and then form a new talent training mode and professional practice construction plan. To achieve the goal of greatly improving students' comprehensive ability, to provide practical talents for social development, and to provide talent guarantee for national and local development.

3.3. Key Problems to be Solved

Give full play to the leading role of teachers and stimulate the main role of students. Teachers and students are the two main elements of the project. In order to play the leading role of teachers, we must first establish the consciousness of classroom teaching with ability cultivation as the core, and have higher requirements for teachers in terms of knowledge and work experience; how to stimulate the main role of students in the teaching process is also the key problem for the implementation of this project to solve, the students to take the initiative to learn, gain the fun of learning, from the gain of learning, progress and the improvement of ability.

4. Implementation Plan and Implementation Method

According to the main reform contents of the teaching reform and the characteristics of the ecology major, the project is mainly completed in the following stages:

4.1. Construction of Experimental and Practical Curriculum System for Ecology Major

This stage is the top priority of the whole teaching reform project, is also one of the important achievements of the project, and is also the basis of the reconstruction of the ecological professional talent training program. The work implementation content of this part is as follows:

1) teaching and research activities. The purpose of the research is mainly three, one is to understand the characteristics of professional talent training. 2 To understand the ideas and suggestions of students and professional teachers on practical courses and forms. Third, to determine the appropriate practical theme. Only appropriate practical themes can motivate students to complete their tasks through collaboration. Fourth, to determine the form of practice.

2) system was initially built. According to the research results, the curriculum system of ecological experiment and practice is preliminarily constructed, clarifying the practice links of three years, the teaching objectives of each link, the form and theme of each link.

3) Core practice teaching team construction. The design concept of experimental and practical curriculum system trains the practical training instructors related to ecology major to achieve the unity of ideas and methods, so as to guide students and form purposeful and effective experimental and practical teaching.

4) put into effect. Implement targeted programs for each grade.

5) Data collection and rectification. Through the repeated implementation, the feedback data of teachers and students on the teaching process and teaching effect was collected, then analyzed, rectified, and the practice process was constantly rectified. Other problems in curriculum and teaching found in the experiment and practice were also recorded and corrected.

4.2. Standardize the Practical Teaching Content and Methods

The practical teaching content is divided into three levels: basic experiment, comprehensive design experiment and research analytical experiment.

4.3. Reform the Credit System and Implement the "One Policy for One Life"

Students combine with the tutor's scientific research project to apply for provincial or university-level college students' science and technology innovation project, college students "Challenge Cup" competition and other activities, and form a scientific research team with graduate students to enter the scientific research work as soon as possible, so that college students can get the tutor's "academic care" earlier, stabilize professional ideas, and formulate academic development plans.

4.4. Build a High-Quality and Efficient Experimental Platform

In I now on the basis of the preliminary work, continue in ecology students' ecological monitoring and evaluation, "applied ecology", "restore ecology" course teaching, implement ability training as the core, summary, adjust, design more, more appropriate experimental practice teaching methods and methods, build quality and efficient experiment platform, through different teaching links, and guide students to actively participate in the different teaching link, make the students comprehensive ability of society needs.

Above for my ecology under the ecological civilization system of some thinking, the curriculum system construction is the innovation of the emphasis on ability training as the core, organize teaching activities, at the same time, improve the comprehensive ability of practical knowledge, the real training students' practical skills, and the ability to solve real problems. This paper tries to organize and transform the teaching method of "practical curriculum system-professional curriculum system and one talent training mode (program)" through the teaching reform of "bottom-up teaching", aiming to cultivate and produce students with innovation.

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