

Master of Agricultural Environment Research on the Cultivation Model

-- Using the Topic of Cadmium Contaminated Farmland Soil Passivation Restoration as an Illustration

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Abstract

Agro-environmental engineering seeks to develop highly skilled individuals with outstanding academic and professional backgrounds. Graduate students will focus on practical practice and receive top-notch instruction in professional technology. As a result, we suggested the cutting-edge talent method for graduate students that is driven by the "project" in the framework of collaborative creativity. The passivation repair of cadmium-contaminated farming soil is the research's practical project topic. The combination of classroom instruction and project practice is based on the project-driven talent training approach. With the help of this project, agricultural colleges and universities will be able to train more top-notch environmental specialists for the advancement of society.

Keywords

Project Practice; Agro-environmental Engineering; Talent Training Approach; Environmental Specialists.

1. Introduction

How to create an efficient professional degree postgraduate training model has emerged as a key concern in postgraduate education in colleges and universities due to the rising demand for postgraduates with professional degrees in society. Professional degree postgraduates have a distinct position in terms of training objectives, methods, and content: to develop high-level talents with excellent professional backgrounds, graduate students will be advised by application practice and will engage in advanced training in professional technology. Therefore, the training mode also has higher criteria for postgraduates specializing in agricultural environment. The application skills of graduate students need to be trained with specific consideration, especially in terms of training methods and training material. We propose a "initiative"-driven innovative talent training model for postgraduates majoring in agricultural environment in the context of collaborative innovation, in accordance with the traits of this professional field and the particular requirements of this field for high-level talents in specialized technical work.

The project-driven approach to education places a focus on the students' intended careers, allowing them to apply their knowledge practically. Teachers serve as assistants to help students solve challenging issues in this relatively open educational approach that emphasizes on students' abilities in teamwork and diverse thinking.

This study starts with the passivation repair of cadmium-contaminated farming soil and develops skills using a project-driven approach. It is useful to confirm students to integrate practice and learning and creates an educational system of "classroom-practice-scientific research," which successfully serves as the second classroom by allowing students to delve deeply into the field to comprehend the real agricultural model. Students' capacity for innovation is further developed through the talent development mode based on the project-driven approach. The project considerably raised the level of experimental design, professional understanding, and practical skill of the students. The initiative acknowledges the beneficial interplay between educational theory and practice and establishes the framework for developing creative professionals in agro.

2. An Outline of Agricultural Environment Majors' "Project"-driven Development of Creative Capabilities

Agro-environmental engineering seeks to develop highly skilled individuals with outstanding academic and professional backgrounds. Graduate students will focus on practical practice and receive top-notch instruction in professional technology. It focuses on cultivating graduate students' application ability and practical ability to solve practical problems.

Many agricultural schools and universities currently have clear standards and objectives for the training of environmental professionals. Create quality courses that are appropriate for environmental students when after analyzing the knowledge and skills they should need. Make acceptable arrangements for required, optional, practical, and special courses by maximizing credits and hours. The growth of environmental experts at agricultural colleges and universities is promoted in this way. The analysis that follows examines the general state of Tianjin Agricultural College's training program for environmental professionals in agricultural engineering.

2.1. Training Goals

Good political, humanistic, and scientific literacy are fostered by the program. The initiative will greatly enhance the learning, research, and invention skills of the kids and give them the opportunity to grow holistically in morals, intelligence, physique, attractiveness, and work. The project courses instruct students in the fundamental theory, fundamental knowledge, and fundamental abilities of environmental science in response to the growing demands of contemporary science and technology as well as social and economic development. to give students the skills they need to work in sewage treatment facilities, environmental protection agencies, environmental monitoring stations, pollution assessment and management firms, etc. to foster the development of highly qualified interdisciplinary individuals working in fields connected to environmental science research and education.

2.2. Curriculum

We must learn from the benefits of the academic master's training model in order to develop a training model for practical ability, and the model will undergo extensive reform with practical ability at its core. Establish and prepare various courses in accordance with various training requirements by conducting an analysis of the professional abilities and job content needed by postgraduates in the agricultural environment in their technical domains or positions. Based on this research, it is vital to arrange not only certain fundamental theoretical courses but also the pertinent coursework for environmental majors in a reasonable and scientific manner. Advanced mathematics, general chemistry, quantitative analytical chemistry, organic chemistry, etc. are a few of the basic courses offered by our school's environmental major; professional courses cover environmental law, soil pollution control and restoration, environmental monitoring, environmental planning, environmental management, and

environmental impact assessment, among other topics. Make it possible for students to use or avoid using environmental monitoring, environmental evaluation, environmental planning and management, and environmental pollution prevention. In addition, the opening of test design and data processing, writing scientific and technological papers, etc., so that the students are developed with specific experimental design skills as well as the capacity to summarize, organize, and analyze experimental results, write papers, and engage in academic exchanges. The professional curriculum structure makes use of the modular method. The necessary modularization enables. Because of the modularization, students can construct a knowledge system more methodically because the pertinent courses or information can be combined across curricula to make a module. The previous teaching method's limitations can be addressed by the modular teaching approach, which enhances students' theoretical understanding and training overall. We must thus completely draw on the good innovative solutions of comparable colleges and universities when developing agricultural talent training programs, and construct environmental professionals training programs for agricultural schools in a more reasonable and thorough manner.

2.3. Recognize the Skills and Knowledge that Students Should Acquire.

Students majoring in the environment at our university are expected to possess a great base in both the theory and practice of their chosen field of study, as well as the fundamental theoretical knowledge such as mathematics, physics, and chemistry. Students must broaden the scope of professional practice and gradually grasp the abilities of technology creation, application, and creative research in the framework of the integration of practice and instruction. The institution also expects college students to have the fundamental literacies and skills needed to do scientific research in addition to the basic skills needed for the modern workplace. Agricultural colleges can effectively combine pertinent ideas to develop environmental experts with pretty comprehensive quality and strong competence by comprehending the knowledge and skills that students should gain.

2.4. Solve the Problem of Inadequate Communication with the Students

There are usually difficulties in communication between teachers and students because the higher education model is more open and available for both teachers and students than the middle school model. The transition from undergraduate to master's degree status has not yet developed students' self-awareness; teachers often disregard the development of students' work due to their heavy workload and other commitments. By improving communication, teachers may more rapidly comprehend students' circumstances and create training plans that are suited for their needs, while students can more quickly adjust to new learning models and change their identities.

3. The Steps and Strategy Used to Resolve the Issue

3.1. Solve the Problem of Inadequate Communication with the Students

Solve the problem of inadequate communication with the students. Education is now more concerned with combining teaching and practice than it is with focusing exclusively on students' academic performance. Schools must clearly know that knowledge is a good servant but a bad master, effectively connect theory with real-world application, and increase students' analytical and practical skills before enhancing their professional quality.

3.2. Abandon One Method of Instruction and Emphasize Practical Application

Refrain from using a single teaching, emphasize practical experience, and improve postgraduate students' practical skills. The passivation remediation of cadmium-contaminated farmed soil is the focus of this study, and as the issue has advanced, important practical

experience has been steadily gathered. The topic examines the experimental data and develops a plan to carry out the passivation restoration of farmland cadmium pollution using a combination of laboratory experiments and field testing.

Knowledge in chemistry, biology, statistics, and how to use experimental equipment are required during the study process. Using this topic as an example, dried rice and wheat samples are ground into powder after drying, and dried recovered soil is combined, ground through a filter, and stored. Analyze the soil's pH, enzyme activity, and other factors to evaluate the heavy metal content of the crops and the soil. Soil culture were conducted, and after the soil had been cultured, Zeta potential, kinetic, and thermodynamic adsorption experiments were conducted on the soil. The significance of the data is assessed using the Duncan's multiple range test and the DPS V17.0 analysis of the data. Origin Pro 2021 created the graphical illustration utilized in the thesis. Students gain a better comprehension and a firmer grasp of the subject as a result of the ongoing promotion of the subject. Additionally, it helps the kids give up their death attitude and increases their hands-on skills. Reading a good book and putting it into practice is how knowledge is expressed.

3.3. Strengthen Communication with Students

To truly teach students according to their potential, mentors should improve communication with them and implement one-to-one or one-to-two teaching models. Although the students are conducting experiments, the tutor must gently lead them, standardize their operating procedures, and promptly address any questions or concerns they could have on the challenges they may be facing. Within a month, the tutor is required to hold a progress report, maintain track of the students' academic progress and real-world outcomes, and to provide pertinent feedback. Postgraduate education no longer consists of a single "cramming" lesson. The scholarly reports educational model can improve students' linguistic expressive capacity by strengthening students' practical skill. Additionally, the academic report mode encourages communication between the teacher and students in order to achieve the goal of shared improvement. While expressing their thoughts, the tutors will actively listen to the students' suggestions in order to learn from each other and advance together. The only way for teachers and students to steadily raise both their levels and the skills of the former is through friendship.

4. Applications of Graduate Practical Teaching Achievements and Their Effects

4.1. Application of Graduate Practical Teaching Results

The research for this teaching achievement centers on the passivation and repair of cadmium-contaminated farming soil, and it is based on the project-driven method's talent programs that offer. Students and teachers conduct a number of studies using the project as the major focus.

(1) Explain the significance of the subject research and its objective

The contamination of agriculture soil by cadmium is the basis for this investigation. The quality of agricultural products will be directly impacted by too much dirt on agriculture. And eating has emerged as the most significant and direct method of exposure to heavy metals for humans. The heavy metal element cadmium is not essential to human survival. Even if a trace amount of cadmium is consumed, it will inevitably have negative effects on human health since it will build up in the liver, kidneys, and other organs and tissues. Cadmium and its compounds were listed as human body carcinogens in 2012 by the World Health Organization International Cancer Research Agency.

(2) The design of the experimental plan

The teacher and the students jointly finished the formulation of the experiment after defining the goal and relevance of the subject research, the mentor as the primary guide, and the overall

overview of the entire issue. The experimental plan is split into three sections for the issues of cadmium passivation and soil restoration in farming, as illustrated in Figure 1.

(3) Mission accomplishment

Experimenting is a part of a continuous learning process. If there are issues, we need to actively gather literature. The students should undertake a typical academic report with the teacher throughout the experiment. The teacher should be informed right away of any issues that cannot be resolved. It not only has a quick solution but also raises the pupils' proficiency in scientific inquiry. Teachers may also improve their accuracy. The following strategy may be influenced by the pupils' circumstances.

(4) Summary reflection

Students must write another academic report when the subject is finished, and the instructor summarizes and comments on the entire subject, including the students' capacity for independent learning, attitude issues, and problem-solving strategies. To spark students' interest and raise the caliber of the subject, teachers must identify any issues that are already present and offer solutions.

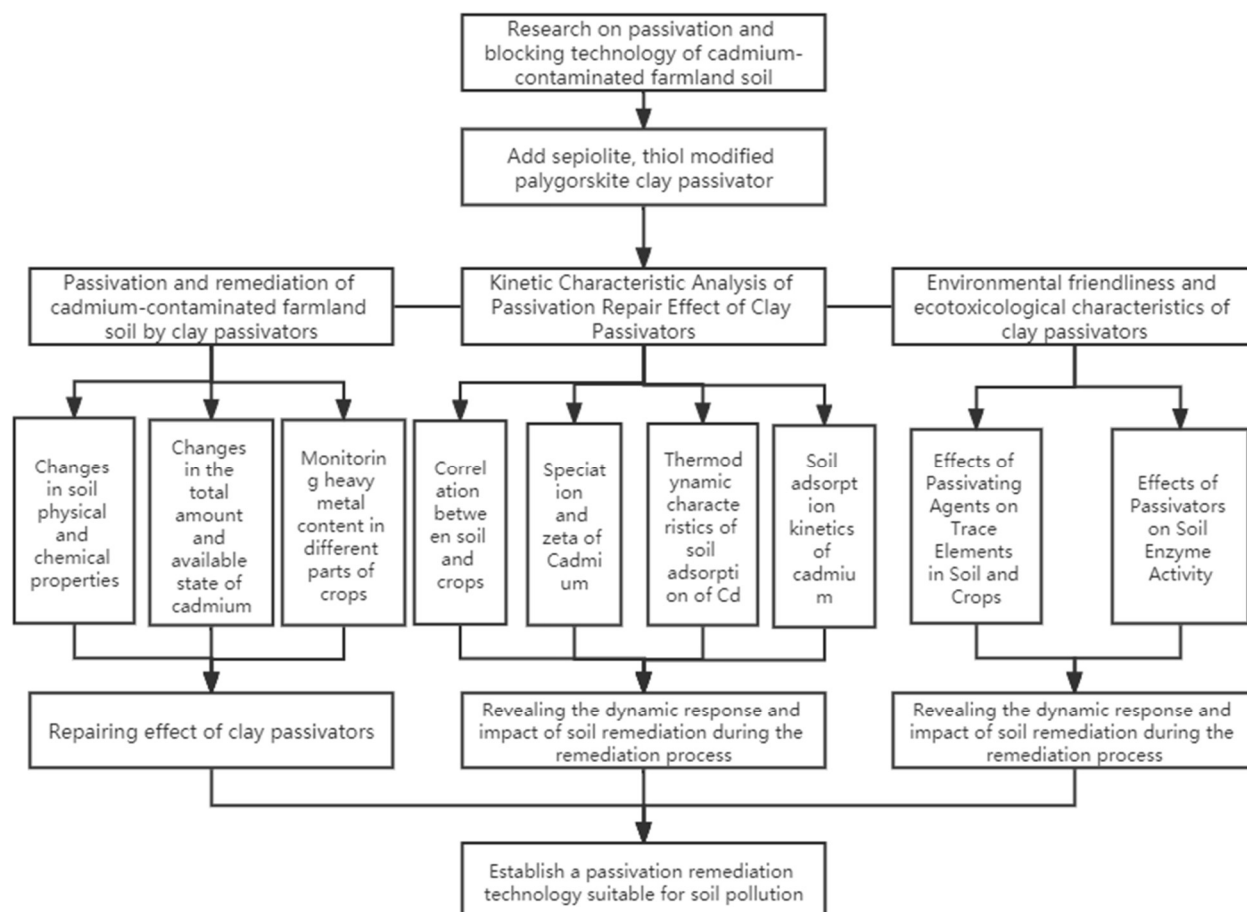


Figure 1. Experimental program

4.2. Application of Graduate Students' Actual Teaching Accomplishments

(1) The talent training model based on a project-driven methodology has a substantial practical impact

Through the study of this subject, a solution to achieve the passivation and repair of cadmium-polluted farmland has been discovered, and great graduate students have been developed using

the project-based talent training model. Participated in the "22nd Meeting of the China Soil Society of Soil Environment Professional Committee" and published a conference paper in addition to publishing two core journals in this field and one English SCI. Students demonstrated obvious advantages in the final graduation thesis session, and teachers generally acknowledged this was due to the strength of the early theoretical and practice root.

(2) Highly regarded by society

Graduate students based on project-driven law have good comprehensive quality, strong self-learning ability, and solid professional ability. Students' theoretical connection and use theoretical knowledge analysis and analysis of theoretical knowledge and use have improved in recent years, according to feedback from public institutions and businesses. Problem-solving skills have considerably improved. Even if you touch on knowledge gaps, you will rapidly complete the necessary knowledge and begin going because of your exceptionally strong capacity for learning.

5. Innovation Points for the Results of Graduate Practical Teaching

(1) Enhance the current educational paradigm and convert to a project-based talent development approach. The talent training model based on the project-driven technique may better reflect the knowledge and skills of students needed to construct the task system when compared to the standard teaching model. In the process of continual completion, students can continue to have a sense of accomplishment, which is more effective to be more effective. The ground encourages the growth of practical skill and knowledge of knowledge.

(2) The project's chosen topic is fresh. Projects for passivating and restoring farmland that has been contaminated by cadmium are intimately tied to human life and health, but at the moment, there is only a limited amount of domestic research that is not very broadly involved, leaving many gaps that need to be filled by future studies.

(3) Educate students one-on-one. Teachers and students primarily showed up with one set of educational paradigms throughout the graduate student. In order to perform intensive scientific research guidance and achieve actual talent training, this research outcomes utilized a one-on-one teaching methodology.

6. Conclusion

The standard teaching mode has been altered by investigating the mode of mixing talent regular training on the proposal way with the subject of passivation and restoration of cadmium-contaminated farming soil, so that students can truly mix theory and practice, in "learning in practice, practice in lessons." The development of students' research-based learning and all-around quality is fostered by project-driven teaching, and this has a positive influence on raising standards for both teaching and education. Project-driven learning may completely engage students' excitement and initiative, can also stimulate students' capacity for investigation and divergent thought, and can promote exceptional abilities, all of which are important for the long-term advancement of society.

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