

# *Construction on the innovation ability of college students in modern agricultural colleges based on the teaching method of "one main line, four combinations"*

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**Abstract:** Modern agriculture is a necessary cornerstone for a country to enter the world, which is based on the continuous promotion and development of the construction of the new agricultural science, in view of the problems such as more teaching, light practice, the lack of ability, fewer teachers, low attention, and the absence of innovative and entrepreneurial talents. And it is also based on the "one main line, four combinations" teaching method, scientific research projects as the main line, to realize the reform of curriculum in politics, teaching, innovation and practice, and it cultivates new talents with modern agricultural thinking.

## 1. Introduction

Current agricultural college students not only have the consciousness of innovation, but also have the willingness to participate in scientific research, technology development and other innovative activities. But there are still problems such as insufficient overall ability, poor innovation quality and weak organizational ability [1]. On the whole, undergraduate scientific research capability is lacking of the following reasons: (1) Cultivate consciousness, and some professional teachers for students' innovation ability training consciousness are relatively weak. They always let alone from the teaching methods into the student's questions, synergy, observation, leadership. Then the innovation ability exercise is impossible. (2) It is not easy to choose a topic. Through the investigation of college students' innovation and entrepreneurship training projects, it is found that most of the students' topics come from teachers' scientific research projects. These topics are often more difficult for college students. (3) Lack of incentive measures. Many universities have not established relevant incentive measures and formulated supporting incentive policies, not to mention the establishment of special funds and commendations and awards. Therefore, in the actual operation process, the enthusiasm of most active factors in these two innovative projects has not been mobilized, which leads to the pending cultivation of college students' innovative thinking and ability, which can't be implemented.

According to the students' level, students also reflect the following reasons: (1) the teaching knowledge points are decoupled from the hot spots. Especially, the experimental teaching content

setting can't track the frontier, and the experimental teaching resources are not rich enough. Students hope to have the conditions and opportunities to contact scientific research, so as to cultivate their personal scientific research ability and innovative practice ability. (2) Students understand the connotation of scientific research, and they have strong interest in scientific research activities, and want to attend knowledge lectures, which are related to scientific research, but most of the students have not published papers, and they are not very satisfied with their participation in their scientific research practice activities.

Therefore, under the background of innovation-driven strategy, the cultivation of innovation ability of college students in agricultural universities should become an important link [2-3]. It is necessary to combine rich research resources and teaching resources. Project oriented promote college students' innovation ability and practice ability. Through the project and teaching classroom, cultural accomplishment, innovation consciousness, and scientific research practice "four combinations", they guide students to analyze and solve problems, actively explore scientific research frontier. It is an important way to cultivate students' innovation ability. This project, which is based on key laboratories, project-oriented science and education integration, so as to realize the laboratory strong support for undergraduate training, further stimulate students' interest in scientific research, and unity. Key laboratory not only plays a role in scientific research, also provide strong support for classroom theory teaching and social services.

## **2. The existing problems in the innovation ability training system of college students in agricultural university**

### **2.1 Emphasis on teaching, light on practice, scientific research projects rely on insufficient ability**

At present, the undergraduate education planning of colleges and universities mainly aims to instill knowledge points and key points. Teachers usually attach the importance to theoretical knowledge teaching and ignore students' need to use scientific research projects as knowledge points to stimulate their learning enthusiasm. But they rarely encourage and guide them to participate in scientific research projects. The formation of scientific research projects is a series of unique, complex and interrelated activities of teachers. The organic combination of scientific research projects and teaching can initially solve the problems caused by students' limited professional knowledge, lack of professional teachers, lack of professional practice opportunities and other problems when students cannot get timely answers in the learning process.

### **2.2 Few teachers, low attention, and the lack of innovative and entrepreneurial talent training system**

Although some universities have a certain understanding of the importance of undergraduate innovation and entrepreneurship education. The corresponding organization and management system are not perfect in the training program of innovation and entrepreneurship talents. For example, some colleges and universities still take academic performance as the main standard of evaluation, and continue to make students focus on learning and examination, thus ignoring the possibility of participating in scientific research activities and projects, so that most students' interest in scientific research has not been stimulated. Finally, scientific research innovative thinking has not been formed, and independent innovation literacy has not been improved. Therefore, in order to maintain the timeliness of the cultivation of innovation and entrepreneurship ability, it is necessary to improve the corresponding organization and management system, formulate the comprehensive ability evaluation system of undergraduates, and increase the proportion of undergraduate scientific research

achievements.

### 2.3 Slow iteration, less communication, and high working pressure of existing teacher resources

The feed development technology in animal husbandry production is constantly iterated rapidly, and the teachers' knowledge also needs to be updated quickly. The practical teaching force of the innovation and entrepreneurship talent training team is still in the "weak" stage, and the practical ability of the innovation and entrepreneurship instructors is generally insufficiently compared with the theoretical teaching ability. Drawing on the foundation of a key laboratory and guided by scientific research projects, our approach to experimental teaching fosters continual discussion, communication, and hands-on practice. This method not only alleviates the burden on teachers engaged in scientific research but also utilizes their projects to guide and enhance college students' innovation and entrepreneurial skills. This symbiotic approach ensures a mutually beneficial outcome.

### 3. Construction of the teaching method model of "one main line and four combinations"

"A main line, four combinations" teaching model is shown in figure 1. The scientific research project as the main line. The education, teaching, innovation and practice four modules with its organic combination, cross fusion, share resource, and further optimize the teaching methods and methods. To broaden the students' innovative spirit and practice ability training path, it builds proper higher agricultural college students' innovation ability training new mode and the new system.

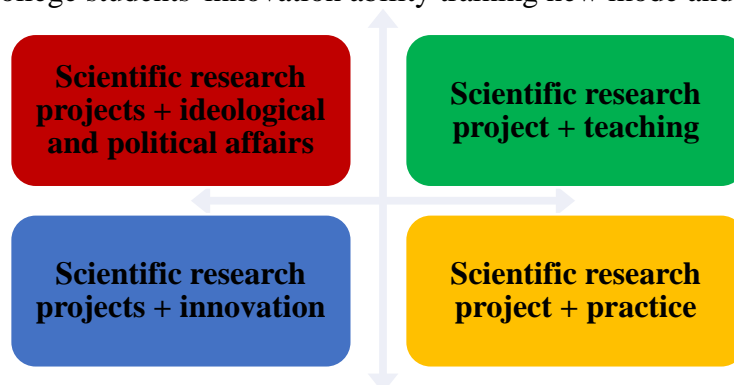


Figure 1: Teaching method model of "One main line, four combinations"

### 3.1 Construction of the separate model of "scientific research project + ideological and political development"

The integrated construction of "scientific research project + ideological and political education" is mainly based on the key laboratories as the organization, and takes cultural literacy and ideological and political education as the basis of scientific research project practice. Through regular series of laboratory open month activities, scientific research lectures, animal husbandry and veterinary related laws and regulations publicity, it further improves the comprehensive quality of college students, and it has fully reflected the scientific cognitive level of college students, innovation ability and practical skills in the new era. At the same time, ideological and political education in colleges and universities should be more combined with professional courses, so as to complete high-quality talent training from the two aspects of professional education and ideological and political education. For example, animal nutrition and feed science direction elective courses "feed hygiene" and "feed additive science" are an important link between animal husbandry major, ideological and political connection. Teachers' scientific researching project applications often closely follow the current political points

and cooperate with the national development outline. It is about the topic "Food security is an eternal topic, which can't relax at any time." This important discourse is deeply implanted in the undergraduates' view of food. Therefore, the combination of "scientific research projects + ideological and political affairs" can improve students' cognition of moral orientation, scientific research value and social responsibility, so as to promote the cultivation of students' innovation ability.

### **3.2 "Scientific research project + teaching"**

The construction of "scientific research project + teaching" mainly takes the key laboratory as the hardware support, and organically combines the rich scientific research resources with the front-line experimental teaching. To enhance the core curriculum in animal science, including feed, animal nutrition, pig husbandry, poultry husbandry, cattle husbandry, and sheep husbandry, we incorporate examples and findings from scientific research projects into our teaching activities, enriching the course content. Specifically, we allocate 60 hours to animal nutrition and livestock breeding experiments within the feed science domain. By employing a project-based teaching approach and integrating scientific research project content with relevant experimental courses, instructors utilize research projects as focal points for application and the synthesis of project outcomes. This approach aids students in bridging theory with practical application, thereby deepening their understanding of the course material. Furthermore, we encourage students to explore the forefront of science and technology to enhance their capacity for innovation.

### **3.3 "Scientific research project + innovation"**

The construction of the integrated training mode of "scientific research project + innovation" is mainly based on the platform of key laboratories, and continue to carry out a series of training activities for college students in scientific research. Invite instructors and students who have engaged in these scientific research activities to elucidate the supportive role of such projects in fostering innovation skills. This can be accomplished by linking the professional knowledge acquired in class with contemporary issues in animal husbandry and modern agriculture. At the same time, it can also be the forefront of teachers' research projects, innovation points to form ideas as the basis, and guide students how to be innovation and promote the formation of innovative ideas. In addition, college innovation and entrepreneurship elites and representatives in related fields can be invited to share their own experiences in the process of innovation and entrepreneurship, so as to help undergraduates who also have a strong interest in entrepreneurship to establish a sound and correct view of innovation and entrepreneurship.

### **3.4 "Scientific research project + practice"**

"Scientific research project + practice" integrated training mode construction, which mainly based on key laboratory for technology, and established project interest group. On the one hand, it lets students actively participate in teacher's research. On the other hand, it improves students' members in college students' innovative entrepreneurship training plan project participation, and lets the students be in the process of scientific research project, experience the team members closely cooperation team spirit, close contact with the top talent in the field of profession. At the same time, through the practice of scientific research projects, capable students are encouraged to participate in the "Challenge Cup" and "Internet +" and other innovation and entrepreneurship competitions, and improve the design of scientific research projects, and get familiar with the writing of project declaration, road show and defense, and further cultivate the teamwork ability.

#### **4. “One main line, four combinations” teaching method reform goal**

We will educate undergraduate students in their logical thinking ability further, then the students will form a thinking mode based on theory to solve practical problems.

Simultaneously, we will encourage them to inform the current research trends within their field of study, and provide them initial training in the operation of key laboratory instruments.

In addition, we should take the initiative practice and application development in the practical environment, and encourage students to participate in various national innovation and entrepreneurship competitions. We encourage them to apply theoretical knowledge to real-world scenarios by advocating for students to solve various problems across disciplines and majors, encouraging the application of theoretical knowledge to real-world scenarios.

#### **5. "One main line, four combination" teaching method reform plan**

##### **5.1 Combine teaching and scientific research with ideological and political education organically**

We will continue to carry out a series of scientific research activities for college students, including lectures on national policies and regulations related to agriculture and rural areas, lectures on scientific research, and training on experimental instrument technology. We will invite guidance teachers and students who have participated in such scientific research activities, as well as teachers and students from multiple disciplines and specialties, to participate together. We will focus on cutting-edge hot topics in animal science, connect professional knowledge learned in the classroom, and explain the supporting role of scientific research projects in cultivating innovation capabilities. We need to encourage students to cultivate scientific research thinking, improve their independent thinking ability, enhance their innovation awareness, establish confidence in their major, broaden their horizons, and ultimately enhance their innovation ability through activities and interactions. In addition, by sharing the development and bottlenecks of their respective research fields, new inspiration is out through the collision of multi-disciplinary integration and cross-professional thinking.

##### **5.2 Rebuild the teaching link**

The teaching links will be implemented in accordance with the top-down overall planning, bottom-up step by step, and re-planned, analyzed and designed through the structured and modular top-down. In addition, the relevant experimental courses should also be based on the "scientific research projects", teaching design and implementation. In highly operational classrooms, project-based teaching methods are adopted, combining project content with experimental techniques to enable students to master the basic operating methods and application scope of instruments through practical operations. For the laboratory related elective courses, the research and concluding project as the application point, integrate the project results, help students to combine theory with practice, deepen the understanding of the course content, and combine the frontier of science and technology to expand thinking, and further enhance the innovation ability.

##### **5.3 Establish a project team with students as the main body**

Based on the existing research directions in the laboratory, establish project interest groups. This approach encourages students to actively engage in faculty research initiatives while also increasing their involvement in college-level innovative entrepreneurship training programs. By participating in

scientific research projects, students gain firsthand experience in teamwork, fostering a spirit of collaboration among team members, and establishing close connections with leading professionals in their field. The laboratory provides students with technology, site, experimental equipment, management and other support and services. About scientific research project basis, bid writing, project implementation, summary report and other comprehensive guidance, and assist interested students to carry out scientific research. At the same time, through the practice of scientific research projects, capable students are encouraged to participate in the "Challenge Cup" and "Internet +" and other innovation and entrepreneurship competitions, improve the design of scientific research projects, get familiar with the writing of project declaration, road show, defense and other links, cultivate teamwork ability and improve comprehensive ability. In addition, the project can also be used to build a platform for students to interact and communicate, encourage students to carry out regular communication activities, fully support students to participate in cutting-edge academic conferences inside and outside the school, and provide students with opportunities to exchange experience, broaden their horizons and share resources, so that students' comprehensive ability has been greatly improved.

#### **5.4 Establish a scientific evaluation system**

In order to maintain the timeliness of innovation and entrepreneurship ability training, it is necessary to improve the corresponding organization and management system, formulate the comprehensive ability evaluation system of undergraduates, and increase the proportion of undergraduate scientific research achievements. For example, innovation and entrepreneurship competitions and related academic lectures are held in the school to provide students with more opportunities for students to participate in scientific research practice, and encourage students to participate in it, and increase their proportion in comprehensive capability evaluation, so as to stimulate students' interest in academic research and exercise students' innovation and entrepreneurship ability. Finally, a comprehensive combination of process evaluation and outcome evaluation is used to evaluate students' innovation and entrepreneurship abilities, and rewards are given.

#### **6. Analysis of the reform effect of "one main line, four combination" teaching method**

By utilizing the "project" as the focal point, the research on the "four-combination" model for cultivating innovation abilities among agricultural college students proves advantageous in nurturing highly skilled entrepreneurial talents in livestock development. Furthermore, this research experience and its outcomes serve as valuable references for undergraduate training across other disciplines, particularly in veterinary science, agronomy, aquaculture, biology, and related fields, thereby contributing to the establishment and enhancement of the "double-gen" education system. Ultimately, it advances the development of innovation and entrepreneurship education systems within agricultural colleges.

This project is innovative, which is based on key laboratories, "scientific research project" as the main line, and combine with teaching, education, innovation, practice, "four lines".It is around" project driven "," tutorial "," discipline "," assessment incentive ", which is based on" scientific research project driven " cultivate the implementation of college students' innovation capability and strategy, for professional teachers for college students' innovative thinking and innovation ability to provide new ideas and reference.

## 7. Conclusion

This project is in view of the current agricultural college students' innovative entrepreneurial ability system construction, through the "a main line, four combinations" teaching method, it will further abstract knowledge, fragmented knowledge systematization, theoretical knowledge time, and cognitive innovation, are finally achieve "student-centered" teaching mode reform. After the teaching reform, teaching results improved significantly, and students understand knowledge, and practice ability. And innovation accomplishment has a significant role in promoting.

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