

# Research and Implementation of a Project-based Teaching Method for Communication Major Courses Guided by Innovation Ability

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**Abstract:** This article analyzes the role of project-based teaching method in improving students' innovation and entrepreneurship abilities, and explores the research and implementation of project-based teaching method for communication major courses guided by innovation ability. Emphasis is placed on the cultivation of innovation abilities in the four stages of project topic setting, development of project teaching method plans, implementation, and project achievement evaluation, aiming to improve students' innovation abilities from the aspects of cultivating professional skills required for innovation, cultivating innovative thinking, and cultivating comprehensive innovative qualities.

**Keywords:** Project-based Teaching Method; Innovation Ability; Professional Skills; Innovative Thinking; Comprehensive Quality

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## Fund Project:

Fujian Province's 13th Five Year Plan Project "Research and Implementation of Teaching Methods for Communication Major Curriculum Projects" (Project No.: FJKCG20-135).

The communication engineering major aims to cultivate applied engineering and technical talents who can engage in design and development, engineering management, technical services, and other related fields in data communication and mobile communication. The goal of its professional course is to enable students to apply various communication technologies to solve various practical engineering problems on the basis of mastering the basic theory of communication. At present, during the 13th Five Year Plan period, communication technology is facing new breakthroughs. Therefore, enhancing students' entrepreneurial and innovation abilities is the core of the teaching work of this major's curriculum to meet the needs of social and economic development.

Implementing project-based teaching methods in professional courses can decompose some practical problems corresponding to the course content in communication system design, development, and engineering management into small projects<sup>[1]</sup>. In the process of completing project design, students are encouraged to combine their knowledge with theory to solve complex engineering problems and enhance their innovation ability.

## 1. Project Teaching Method for Enhancing Students' Innovation and Entrepreneurship Ability

To cultivate students' innovation and entrepreneurship abilities, it is necessary to cultivate the professional and technical abilities required for innovation<sup>[2]</sup>. Therefore, in the teaching process of professional courses, while consolidating basic theoretical knowledge, project teaching emphasizes the cultivation of professional abilities required for innovation. In addition, it is also necessary to cultivate innovative thinking and comprehensive qualities such as project management ability and team collaboration ability in project teaching.

### 1.1 Developing professional skills required for innovation

To be innovative, one must first lay a solid foundation<sup>[3]</sup>. In the teaching process of professional courses, it is very important

to have a solid foundation of theoretical knowledge.Emphasis should be placed on cultivating the foundation of communication majors,enabling students to master the relevant basic theories of communication majors and laying a solid foundation for innovation. The project-based teaching method combines theory with practice and conducts teaching during the project implementation process.The project-based teaching method focuses on cultivating practical abilities,allowing students to combine their knowledge to solve practical problems.Integrating basic theoretical knowledge in practical applications not only consolidates professional knowledge,but also deepens the understanding of theoretical knowledge,playing a positive role in stabilizing basic theoretical knowledge.At the same time,students have improved their ability to analyze and solve problems during the project implementation process.

### **1.2 Cultivating innovative thinking**

While laying a solid foundation,it is also necessary to cultivate students'innovative thinking.Innovative thinking is the soul of innovation,and the cultivation of innovative thinking is the core of cultivating innovative ability.In the nine-year long primary and secondary education for students,due to social factors,most tend to focus on exam-oriented education.Quality education often becomes a mere formality,which to some extent limits the formation of students'innovative thinking.Therefore,in the university stage,it is necessary to open up students'thinking patterns.The project-based teaching method can guide students to consult the latest literature at home and abroad at the beginning of project design,understand the latest developments in the industry,and understand the cutting-edge innovative methods,concepts,and cases in the industry,thereby forming a fulcrum for innovative thinking.Then,during the process of project implementation,students gradually develop their own thinking through practice,gradually form a certain level of innovative thinking,complete project design,and create some innovative points in the project.

### **1.3 Cultivating comprehensive qualities such as project management ability and team collaboration ability**

At present,in cultivating innovative abilities,most teachers focus on imparting professional knowledge and professional abilities,but do not attach much importance to the cultivation of comprehensive qualities such as project management ability.Most student innovation and entrepreneurship projects often have only formal forms and very few are ultimately implemented.Therefore,in the project-based teaching method,it is necessary to strengthen the cultivation of comprehensive qualities such as project management ability and team collaboration ability.

The project-based teaching method sets up multiple projects in each professional course and groups students into groups,with each group completing one project.The student design team independently manages the feasibility analysis and market evaluation of the project, personnel management, plan development, component procurement, implementation process management, debugging, and result analysis. After the project is completed, students develop a certain level of project management skills, starting from not knowing how to complete a project and gradually understanding and experiencing the project completion process.

Each project requires the full cooperation of student team members,and students can appreciate the importance of teamwork during the project design process.Completing project design requires team members to rely on each other and collaborate together to solve complex engineering problems,coordinate necessary actions,continuously innovate,and rely on team cooperation to form good project results.It is easier to generate new ideas in team collaboration.Each group member has their own advantages and will form their own ideas,which forms the diversity of group members.The diversity of group members helps generate sparks of conflicting ideas,helps to concentrate innovative thinking during decision-making,and thus produces a relatively good innovative solution.

## **2. Implementation of Project-based Teaching Method for Communication Major Courses Guided by Innovation Ability**

The communication major curriculum is oriented towards innovation ability,and the implementation of the communication major curriculum project teaching method requires attention to the cultivation of innovation ability in four stages:project setting,development of project teaching method plans,implementation,and project outcome evaluation<sup>[4]</sup>.

### **2.1 Topic setting for communication major course projects**

Professional course teachers design multiple sets of different projects based on the development needs of the communication industry,and choose projects closely related to current social life as the main content.When students choose a project,they can search for information,understand the latest developments in the field of communication and the latest social demands for communication,understand the cutting-edge innovative methods,concepts,and cases in the industry,and form innovative

fulcrums.

Due to the different requirements of each project's specific environment, the workload of each project needs to be evaluated based on the actual situation during the project topic determination process. The workload of the project should be adjusted to allow students to complete it within this semester. Meanwhile, in order to ensure fairness in the final assessment of different groups, efforts should be made to ensure that the workload of each project is basically the same. In addition, to assess the innovation ability of each group, the novelty of each project setting should also be basically consistent.

## **2.2 Developing a project teaching method plan**

Firstly, the characteristics of each professional course project are analyzed and the process plan for that course project is determined. The key and difficult points of the set project are analyzed, and potential problems that may arise during the implementation process are summarized. Then a contingency plan is prepared. Some difficulties often lie in the innovation points, and heuristic guidance schemes need to be set up.

Secondly, the project is broken down into several progressive phased tasks, thereby breaking down the complex system into several modules. In this way, each module is relatively simple and corresponds to phased tasks that combine the corresponding knowledge points in classroom teaching. Students follow a progressive decomposition of the project process and gradually complete it as the course progresses, making it less difficult to maintain a passion for exploration. Based on the teaching knowledge points of the course "Access Network Technology", the course project is divided into six phased tasks, namely: system scheme design, network management system design, equipment configuration, optical distribution network design, transmission performance index design, installation and deployment design. Through the decomposition of these six stages, guide students to combine the basic theoretical knowledge of the course "Access Network Technology" with practice, and integrate them closely.

Thirdly, in this process, when encountering some issues that are not mentioned in textbooks, students are encouraged to learn independently, and form innovative thinking and bold innovation from the cutting-edge innovative methods, concepts, and cases in the industry.

## **2.3 Implementation of project-based teaching method**

Project topics are published, allowing students to analyze the characteristics of the project. Projects based on their own interests are chosen, and they freely combine into multiple project groups. Interest is the driving force of innovation. Allowing students to choose projects based on their own interests can motivate them to engage in project design with greater enthusiasm and motivation for self-directed learning.

In the early stage of project design, each group searches for information based on their own topic. Students learn about industry development trends and other knowledge by consulting the latest and authoritative literature at home and abroad. In the process of designing solutions, students engage in group discussions, starting from functional requirements, analyzing the information they have obtained and conducting scheme argumentation. Afterwards, the group members work together to design the system plan and brainstorm feasible solutions and innovative points.

Next, students carry out group division and personnel management on their own. Each member is responsible for a module and regularly conducts group discussions to coordinate the relationships between the modules, reflecting innovation awareness in the design process. In coordination with the course progress, during each phased task, each group is allowed to explain the corresponding module design progress of the project for their own group. For example, when it comes to network management systems, in the next lesson, representatives from each group explain what kind of network management system is designed for this project and why it is designed in this way. Students who learn while doing not only gain a deeper understanding of classroom knowledge, but also develop an interest in learning. At the same time, while listening to other groups' choices of thinking, others can also learn from each other and improve together. Finally, each module is combined into a total system, and group discussions are conducted to adjust the overall plan, debug simulations, modify system issues, and complete project design. In this process, students can understand the meaning of the team and the different roles within the team, and then understand their responsibilities and obligations for completing team tasks. They can work together and fully appreciate the team spirit.

In the process of project design and implementation, students optimize solutions through simulation or experimental information synthesis based on the design scheme, while also conducting cost control and management, doing well in quality control and project management, and cultivating project management awareness.

## **2.4 Project Achievement Evaluation**

During each stage of the task, each group is rated for the corresponding module design progress of the project, and the average

score of each stage is taken as the average project score. Before the end of the semester, a project defense is conducted. The students' project design achievements will be assessed, and their scores will be used as the defense scores. Meanwhile, students need to complete the project design report, and the teacher will review the project design report and provide the project design report score. In the scoring criteria for defense scores and project design report scores, the innovation points of project design are important assessment items. The final score of project design is composed of defense score, project design report score, and regular score in a certain proportion. This ratio can be determined by teachers of various professional courses based on the characteristics of the course.

### **3. Conclusions**

The project-based teaching method of communication major courses guided by innovation ability can better meet the practical needs of engineering and cultivate students' innovation ability. Combining the design, planning, implementation, and other stages of project-based teaching methods with the cultivation of innovative abilities has a significant effect on improving abilities. Through this teaching process, students not only better consolidate basic theoretical knowledge, but also cultivate innovative thinking, project management ability, team collaboration ability, and other comprehensive qualities.

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