

# Demand-Oriented Exploration of Interdisciplinary Graduate Students' Training Method

Xueping Zhang

PLA University of Science and Technology  
Nanjing, China  
cxnbox@163.com

Xiaoning Chen

PLA University of Science and Technology  
Nanjing, China  
cxnbox@163.com

Wen Li\*

PLA University of Science and Technology  
Nanjing, China  
liwen\_lgdx@163.com

Zaihui Wang

PLA University of Science and Technology  
Nanjing, China  
cxnbox@163.com

\*Corresponding author

**Abstract**—Research the training method of interdisciplinary graduate students. Including new training scheme design, training graduate student leadership and management of scientific research ability. Selecting innovative research or research topic from the actual needs, cultivating graduate students innovation ability. Trying to make graduate students not only have innovative thinking and high technology, but also have the leadership and management ability, have the skills to find problem, inductive problem, coordination, organization and solve problem, with a clear expression ability, good communication skills. Practice has proved that the new method is effective.

**Keywords**—component; demand-oriented; interdisciplinary; graduate students; training

## I. OVERVIEW

21st century is the information age and knowledge explosion age, more and more needs to have abilities of high-level talents. Universities often emphasizes the theory of graduate student research ability, and ignore the integrating theory with practice to solve specific problems research ability training, hardly develop leadership ability, scientific research management, and other comprehensive ability, graduate students after graduation are often alienated from society, it takes a long time to enter the role, so we put forward this training method "demand oriented interdisciplinary graduate student", try to design the new training plan; Cultivating graduate student leadership and management of scientific research ability; Guiding graduate students selected topic and cultivating graduate student innovation ability, organization and coordination ability, problem solving ability and so on four aspects of in-depth study and practice. Break through the traditional method of graduate student training, has carried on the teaching reform, to cultivate and bring up the country needs of high-level innovative composite people, we should explore the new method, theory and implementation way, finally ,through many years' practice verify the validity of the method.

## II. NEW TRAINING SCHEME DESIGN

Cultivating graduate students is a systematic project. Training plan is to run the guidance of whole system engineering. Therefore, the design could satisfy the requirement of demand oriented interdisciplinary graduate training scheme, is the first step in this research, mainly from five aspects.

Training graduate students in addition to be carried out in accordance with the school of "graduate training scheme", this study attempts to postgraduate students are divided into "horizontal" and "vertical" two main line, for the three-dimensional cultivation. "Vertical" means the study of graduate education mainly divided into four stages, course learning, literature review, research and thesis writing. "horizontal" is mainly refers to cultivating graduate student scientific research ability, moral quality, cultural quality and management ability. Therefore in the curriculum, training mode and method have made the corresponding adjustment.

High-quality talents first must have a firm faith and good morals. So during the entire period of graduate study, strengthen graduate student for underdeveloped country modernization thought education, cultivate the concentrate, careful, patient and high sense of responsibility to work. Cultivate healthy psychological personality, modesty, enthusiasm, brave, strong, optimism, not afraid of difficulties and the quality of the spirit of collaboration.

Information age needs elite talents who have wide knowledge and master the latest knowledge of modern science and technology. Therefore increased the interdisciplinary course, improve the graduate students to master the new knowledge, new technology, new equipment requirements, clearly put forward the graduate student must refer to more than 100 papers in Chinese literature, more than 50 foreign literature, widely understand the trends of development and frontier technology.

High-level talents should not only master modern science and technology knowledge, but also must have the stamina and

sustainable development potential. Therefore, Guiding graduate students to read the latest science and technology literature, master science and technology development dynamic and cutting-edge knowledge, cultivate their creative thinking and ability to apply.

To understand the characteristics of every graduate student, set and adjust the corresponding training plan to make its objective, according to their aptitude, trying to cultivate a character has a special high-level military talents.

### III. TRAIN GRADUATE STUDENTS' LEADERSHIP AND MANAGEMENT OF SCIENTIFIC RESEARCH ABILITY

From Psychology theory, ability refers to the smooth completion of individual mental characteristics required by the activities [1], usually refers to a person's mental outlook, it is by the people in the adaptation or change reality environment formed in the activities of various ideological and psychological characteristics of the internal power system, in short, refers to the personal consciousness of some tendencies and the sum of all kinds of stable and unique psychological characteristics[5]. Capacity must be linked with practice. It is only through practice can show people's ability, development ability and the ability to understand people. Ability is strong or weak, measured through the practice of efficiency, smooth degree and completion of the tasks and get success rate.

Leadership and scientific research ability of organization must be practiced in a team, to cultivate and develop. Therefore, carry out from the graduate student and mentor to guide graduate students two aspects.

Make the graduate students guided by tutors compose a team, create a collective research environment, encourage graduate students to participate in research activities and give them the opportunity to practice, for example, let them participate in the project reporting, personnel arrangements, research process design and arrangement of project acceptance and a series of activities, from which to develop their management skills. Apart from that, arranging graduate of high year lead junior graduate students to do a small research project practice. From project design, software programming to hardware implementation, experience the whole process of scientific organization and management, you can get good results. In addition, give them the opportunity to assist instructors organize periodic low-grade classmates study report, the contribution of academic work. Gradually practice leadership and organization.

Encourage graduate students to participate actively in the activities of the team, actively participate in some activities of the organization, coordination and management of the work, it is best able to lead some students to complete a certain task. Encourage graduate students in practice progress activity initiative to team officials and mentors, regularly exchange ideas and to obtain the right way from them, to guide their practice, thereby enhancing the leadership and organizational skills.

### IV. PREPARE YOUR PAPER BEFORE STYLING SELECT INNOVATIVE RESEARCH OR RESEARCH TOPIC FROM THE ACTUAL NEEDS

The purpose to train graduate students is to make them capable of performing the work of the future, to meet the social demand for talent. In traditional graduate students training graduate subjects made less link with social realities, resulting out of touch with the actual demand research, graduate often do not work quickly. Therefore, the choice of subject combining innovative social needs is one of the key of training graduate students. Innovation is the scientific vitality, the purpose and chase of postgraduate research activities, and an important manifestation of scientific level. train graduate students creative thinking and innovation is one of the key post-graduate work , throughout the entire process of determining an innovative the topics for graduate students in his research work to play the enthusiasm and creativity is a powerful impetus . Prompting them through arduous efforts must be completed, the objective of creating a subjective effort. So choose innovative project is an important part of graduate students .when choosing topic, the instructor provides several research directions for graduate students , encouraging them to think, to innovate, and to discuss with them , and finally decided to study the issue. Specific mainly from three aspects:

From existing equipment or running system started, detailed know its' working principle, structure, production process, application status and use of the deficiencies or problems, select research subject from them to solve practical problems. As 2007 graduate Liu ,who is very interested in the future all-electric aircraft, so help he chose to develop an all-electric aircraft equipment as a graduation project, guiding him how to apply the principles of electrical equipment to the current aircraft machinery and equipment, develop small and light weight alternative to bulky electrical equipment machinery and equipment. It is proved that under the guidance of his mentor, he well completed thesis. It has also been found to stimulate students' interest is to playthe source of his creativity and motivation.

Guide students access to a large domestic and international technology trends and practical application of the relevant information, summarize what we behind the foreign country, or the construction of the necessary equipment or systems, from which to choose suitable post graduate research projects, to do some theoretical and meaningful research.

Encourage graduate students go to the factory to do research and practice. 'Practice makes perfect', in practice to constantly exploring new issues, refining problems, constantly thinking about how to study and solve the problem, under the guidance of an instructor, to choose a graduate research projects that both a community need to be addressed and is suitable for postgraduate issue of ability. This is often the result of innovative entry point, the growing point of innovation capability. "Behind closed doors" can never be innovative.

In addition, the course instructor in the thesis advising must pay special attention to the establishment of the theory or data. Guide students to the factory floor and go deep into practice, or

attain them from the actual work of other people, and the final research results must be proven.

#### V. CULTIVATE GRADUATE STUDENTS ABILITY TO INNOVATE, PROBLEM SOLVING SKILLS, ORGANIZATIONAL SKILLS

In future work, graduate students should have the sensitivity, the ability to detect problems in time .when problem is discovered, they can the organize actual operation and maintenance personnel and communicate well with them, think and summarize the problem, then clearly report to their boss, namely good communication skills, presentation skills and organizational capabilities. Traditional graduate education, rarely develop this capacity, many graduate students are often expressed in poor, unable to communicate with the upper and lower levels, so that the problem can not be solved in time. Therefore, in the process of training graduate students to explore a number of measures:

Guide graduates find the problem from theoretical analysis and experimental results differences or contradictions, carefully observe in the process during the experiment, to capture suspicious phenomenon and to use the theory analysis, and comparison. Guide the students to discover new problems by themselves. Help graduates to analyze, find the problem from the practical application problems or phenomena. Interdisciplinary graduates application guidance and discipline to understand and explore the edge of a new problem.

Focus on teaching graduate students, problem-solving approach, through practical examples to demonstrate scientific root of the problem, analytical methods and settlement process, cultivate students consciousness of explore how to solve problem and to give students practical training opportunities. Also note that cultivate graduate students creative thinking, perseverance, confidence in overcoming difficulties, perseverance and ability.

Make efforts to train graduate students communication skills, social skills, language skills and written expression skills. Explain literature, academic and research report writing format, writing methods and techniques, to make graduate written expression rigorous and concise, with reasonable structure, clarity level and clear logic. Throughout the period of post graduate training, regulate and guide them to read 100 or more Chinese literature and more than 50 papers in English, regulate and guide them write book reports, publish more papers, organize a discussion and academic exchanges each week, provides a summary of the work monthly, each semester in the studio, do a work report teachers and students at the same time, prepared and after report and multimedia course ware. In addition, encourage and supervise postgraduate academic

papers, directing graduate thesis writing. After three years of continuous training and exercise, every graduate student can greatly improve writing skills, language skills and social skills.

Finally, we need to emphasize that the "demand-oriented graduate training complex" is a fairly complex and long-term work, not a single method, but the integrated use of the method described above, this article is just made of the various methods, induction and extracted. Explore and practice from the many years of postgraduate training work since 2007.

#### VI. THE RESULTS OF RESEARCH AND PRACTICE

From 2007 recruit graduate students began to gradually explore the culture of demand-oriented graduate complex training method. After several years of exploration and carefully cultivated, 2007-2011 session of the graduate students successfully complete their education, and have achieved good results, and some admitted to doctoral students to continue their studies.

Such as Zhou of the 2008 session successfully completed the graduate study and research in June, 2011, completed a thesis and graduation reply. During the school he published six papers, including two English papers accepted by EI, two cores. Thesis except in accordance with tutor required to complete the research, theory, up to a certain depth, but also put forward a certain innovative ideas and methods. Papers blind trial results as excellent, the experts give a higher rating, graduation Chairman suggested that the respondent when the respondent recommended as outstanding papers.

#### VII. CONCLUSION

Graduate training is a complicated systematic project, but also a long and work process. Training composite graduate to meet the needs of the information age, requires careful planning and design, patience, nurturing and guidance. From the four major aspects of this subject, namely the design of new training programs, training graduate students leadership and research management skills, guidance and training of graduate students' topic selection and ability of identify problems, communication and coordination ability, ability to solve problems, to make in-depth exploration research. Through specific postgraduate training proved that the subject proposed method is effective.

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