

# A Probe into the TPE Model for the Cultivation of Scientific Research Innovation Ability of Design Academic Graduate Students

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## Abstract

With the rapid development of the times, the problem of insufficient scientific research innovation ability of design academic graduate students is becoming more and more obvious. In this case, by analyzing the characteristics of the cultivation of academic innovation ability of academic graduate students at home and abroad and the present situation of design academic graduate education in China, this paper puts forward to strengthen the cultivation of academic innovation ability of design academic graduate students by establishing a new T(Topic group)+P(Paper group)+E(Exhibition group) model. Of course, the cultivation of scientific research innovation ability of design academic graduate students is a long and systematic process, which needs to be completed together by synthesizing the forces of all aspects, which requires all kinds of roles to do it and make efforts.

## Keywords

Design, graduate students, scientific research innovation.

## 1. Introduction

Graduate education is an important way to cultivate national academic innovation, technological innovation and other talents, and academic graduate students are also the main source of academic researchers in scientific research institutes. In recent years, the academic graduate education of design major in colleges and universities in China has flourished and trained many outstanding talents. However, the academic graduate students majoring in design are different from those in other specialties. Most of the academic graduate students in other majors aim at improving the ability of scientific research and innovation. At present, the cultivation of academic graduate students majoring in design is mainly to participate in practical projects, while neglecting the cultivation of their scientific research and innovation ability. But I have to take it. It is recognized that innovation is not only the necessary ability for academic graduate students to engage in scientific research, but also the necessary condition for the development of science and technology in our country, so it is of great practical significance to cultivate the scientific research innovation ability of design academic graduate students. In order to cultivate this ability, it is necessary to establish a perfect training model. Based on the comprehensive analysis of the characteristics of academic innovation ability training of design academic graduate students at home and abroad and the existing problems in China, this paper puts forward that T (Topic group) +P(Paper group)+E(Exhibition group) can be established, hoping to have certain reference significance for strengthening the scientific research innovation ability of design academic graduate students. [1]

## **2. Characteristics of Cultivating Academic Innovation Ability of Design Academic Graduate Students at Home and Abroad**

### **2.1. Characteristics of Cultivating Academic Innovation Ability of Design Academic Graduate Students in Foreign Countries**

After analyzing the universities in Europe, the United States and Japan, Rosovsky (former dean of Harvard School of Arts and Sciences) said: the main factors that world-class universities can cultivate excellent graduate students are: (1) absorbing excellent talents and combining with regional society to develop the driving force; (2) accepting foreign students and internationalizing the idea of running a school; (3) strict and effective management mechanism; (4) providing first-class equipment for students; (5) theoretical practitioners and experimenters can work creatively together. Based on these factors, the cultivation of innovation ability of design academic graduate students abroad has the following characteristics.

#### **2.1.1. Internationalization of Design Education**

At present, some developed countries have set the development goal of the globalization of design education based on their own national conditions. As early as the 1980s, the Japanese government set up a design department, and promulgated design standards regulations to carry out activities to exchange design, so that Japanese design to serve the lives of the Japanese people, and trade with other countries; In Finland, the government controls the formulation of the corresponding design regulations, integrates the design into the national innovation system, and improves the students' innovation ability through the development of design education and expansion research, so as to enhance the international competitiveness of the country.

#### **2.1.2. The Teaching of "Studio Tutor" System**

As a milestone in the education of art design, the German Bauhaus has taught not only the basic course of painting, but also the art of the traditional technology of the students in the working chamber, the modern manufacturing technology and the understanding of the material characteristics, etc., and is called the "Director of the working chamber". At present, the design institute of the developed country still adopts the working chamber system to carry out the teaching, such as the students of the School of the Art of Amherst and the Landscape Design Institute of the University of Massachusetts of the United States, directly participate in the traditional and modern process, change the old teaching that only the drawing will not practice, The school also provides both the place and the free material, and really does the "for all the students".

#### **2.1.3. Attach Importance to the Combination of Theory and Practice**

Foreign colleges and universities attach importance to the combination of theory and practice in educational methods, for example, some traditional cultural courses will be offered in the curriculum. In the United States, students will study traditional regional culture in the form of field visits; in Japan, Tokyo University of the Arts will arrange for students to spend two weeks on ancient Japanese art visits. In addition, many famous foreign universities have built science parks around the school, which provide students with more favorable scientific research conditions. In a word, foreign colleges and universities pay attention to the practicability of specialty in personnel training, and give full play to the function of university serving society and improving national quality to the maximum extent. [2]

### **2.2. Characteristics of Cultivating Academic Innovation Ability of Domestic Design Academic Graduate Students]**Section Headings

The development of the design class in the domestic universities has achieved good results in both the academic and the academic fields, and the different colleges and universities have

different characteristics for the training mode of the academic postgraduates of the design class, on the basis of this, the following features are summarized.

### **2.2.1. Strict Selection System**

Most of our universities design academic graduate selection system is more strict than professional graduate students, students in the undergraduate stage in addition to the need to have excellent professional knowledge, but also in scientific research innovation, which to a certain extent is conducive to students to the subject, papers and other related scientific research projects.

### **2.2.2. The Teaching Mode Is Mainly Based on the Mode of Transmission and Instruction**

Teaching has been going on for thousands of years in our country. As the oldest and greatest teaching mode, it still has its vitality today. However, this teaching mode has its limitations in the graduate stage. The values of the students in the graduate stage have been roughly formed, and they often have their own thinking. At this time, if the traditional teaching is still carried out, it will inevitably limit the development of students' thinking, especially in the teaching of design major. No matter what kind of design, scholars need to have beyond the imagination and thinking ability of ordinary people, and the teacher's point of view can not occupy a dominant position in the students' point of view, which is all set up. The ultimate training goal of academic graduate students majoring in statistics.

### **2.2.3. The Professional Division Is Detailed**

There are many major categories in the research direction of design major in colleges and universities in our country, including fine division, planning and design of a city, environmental art design as small as a few hundred square meters, and so on. This is helpful for graduate students to master the knowledge within the specialty, but the knowledge of graduate students is also limited by the major, especially the design major needs a variety of specialties, the integration of a variety of disciplines, the division of specialties will make it difficult for graduate students to adapt to the comprehensive requirements of scientific research to a certain extent.

## **3. Problems Existing in the Cultivation of Innovative Ability of Design Academic Graduate Students in China**

### **3.1. Shortcomings in the Teaching Contents and Teaching Materials of Graduate Studentssection Headings**

The serious shortage of teaching content of design academic graduate students in China is a common problem at present. For example, environmental art and design major, it can not be separated from architecture, environmental art design is a water without a source, no basic wood, so the graduate students of this major should have the ability of architectural knowledge; and the graduate students majoring in environmental art and design can not learn as deeply as the students majoring in architecture, so wide, only need to master the knowledge related to this subject. Therefore, the course of Architectural Design Foundation is more in line with the architectural course of environmental art design major and can be introduced appropriately. But so far, there are still some colleges and universities that have not even To offer the teaching course of architectural basic knowledge for the graduate students of environmental arts, this aspect of the deficiency needs to be filled urgently.

### **3.2. Graduate Practice Base Has Not Yet Been Fully Established**

Because graduate students expand enrollment year after year, and teaching is mainly in large classes, only a few marginal disciplines are added to the practice of curriculum reform, and few colleges and universities are willing to invest a lot of money to set up training laboratories, and

mentors can not provide corresponding design institutes or companies as practical bases. Teachers basically use practical experience to guide in practical teaching, lack of effective and systematic training syllabus, resulting in the lack of original results of graduate students and low quality of scientific research.

### **3.3. The Teaching Management Is Backward, the Training Mode Is Single, and the Academic Atmosphere Is Not Strong Enough**

At present, the way of teaching design graduate students in colleges and universities in our country is still mainly teaching, the training mode is single, and there is a misunderstanding of emphasizing knowledge imparting rather than students' creative ability in the process of training, as a result, most graduate students are passively accepting the knowledge taught by their teachers, and their active learning spirit and personality development are restrained, and they cannot transform the 45-minute classroom teaching into independent acceptance of knowledge and summary innovation. In addition, because some tutors are weak in their own scientific research consciousness, graduate students study in the environment of lack of scientific research atmosphere, it is difficult to form scientific innovation consciousness, and the development of innovation ability is slow, which cannot adapt to the development needs of the present era.[3]

### **3.4. The Undergraduate Stage Fails to Pay Attention to, and the Scientific Research Achievements of Design Majors Lag Behind Those of Other Majors as A Whole**

For those undergraduates majoring in design who do not plan to study for graduate students, they think that the results of scientific research do not play a great role in their own, the experience of participating in the actual project can play a decisive role in the future employment, and the reality does give them a positive answer, so very few students can follow their mentors to participate in the scientific research project at the undergraduate stage. To a certain extent, the scientific research level of the whole design specialty is far lower than that of other majors. However, in the long run, there is a great difference between the cultivation of scientific research ability and the cultivation of application ability. It is not the ability that can be developed in three or five months, but has to go through long-term grinding. In order to get results, this is also the reason why most undergraduates give up scientific research results. Although the cultivation of scientific research ability is hard, but this is also the ability and quality that the school hopes us to cultivate.

## **4. Construction of TPE Model for Cultivating Scientific Research Innovation Ability of Design Academic Graduate Students**

The current problems mentioned above are not individual cases, and society also has a certain demand for researchers. Based on this, and in the reality of the large base of graduate students in our country, this paper puts forward the establishment of a new T(Topic group)+P(Paper group)+E(Exhibition group) training model, and in order to successfully form this "three-in-one" model, we still need to start from the following aspects.

### **4.1. T: Training Scheme+Scientific Research Training+Evaluation Mechanism**

In order to cultivate the scientific research innovation ability of academic graduate students majoring in design with the mode of research group, we should give full play to the role of research group in the innovation of subject specialty. Therefore, it is necessary to formulate a training program in accordance with the actual situation of graduate students, and to carry out the training of scientific research and innovation ability in an orderly manner, and finally to evaluate and feedback the results. To this end, we should focus on the following three aspects.

#### **4.1.1. To Formulate A Training Scheme in Line with the Formation of Students' Innovative Ability**

It is the premise of carrying out the cultivation of graduate students' professional innovation ability to formulate a training program in line with the actual situation of students. Therefore, the school can assign the students to the professional mentors with research topics at the graduate entrance stage, form a research group, and promote the graduate students to carry out the project activities through the formulation and implementation of personalized training programs. For example, in the aspect of each student's topic selection, some students dabble in the history and theory of design, and happen to have mentors who study design theory deeply, then they can form a "one-to-one" or "one-to-many" training method, which is a very important part of the training program; and the formation of each subject must have a The topic with the nature of the times is not limited to the topics that people like to talk about, but more to find those things that may be forgotten by people and still have its vitality today, because the significance of the existence of the subject is the urgency of the urgent present situation and the urgency of the urgent times. As far as the research group itself is concerned, its training mode is different from that of classroom teaching. The number of students in the group is small, the training cycle is longer, and the emphasis is placed on the cultivation of ability. therefore, the tutor can first interview the students who want to enter the research group, then formulate the training plan according to the development plan and actual conditions of the research group, and then arrange the training plan according to the training plan. Students participate in innovation practice activities in the group, so that students can obtain the corresponding professional innovation ability.

#### **4.1.2. Actively Carry Out Innovative Teaching and Training According to the Training Scheme**

The implementation of the training scheme is the key to the formation of students' professional innovation ability. The advantage of the research group is that it can provide a series of supporting elements for the implementation of scientific research innovation ability training activities of graduate students. According to the training program and the actual situation of graduate students, it is the key to realize the implementation of the training program to give full play to the advantages of all kinds of resources. In order to ensure the effective implementation of the training scheme, the research group needs to find the appropriate combination point to cut into the teaching according to its own research direction, and integrate into the new direction of the current research field. Taking the design concept of the latest design project as an example, after understanding the basic situation, the research group can set up the design. The idea carries on the characteristic, the application scope and the influence research. After the students initially possess the basic skills of the concept research, the tutor can arrange the students to participate in the scientific research training of the research group. In the process of training, the students' scientific research skills can be continuously strengthened through the field guidance, so that the students can gradually acquire the systematic scientific research ability. In order to further improve students' scientific research and innovation ability, mentors can also set research tasks for students to solve in practice according to the problems in the research. Of course, the implementation of the training program can not be separated from the active cooperation of students, so the tutor of the research group can not only guide the interest, but also carry out the final research results and learning of the subject. The reward mechanism of students is linked to improve the enthusiasm of students. Through the above series of measures, with the joint efforts of teachers and students in the research group, students' professional innovation ability can be greatly improved.

### **4.1.3. Establishing An Appropriate Teaching Evaluation Mechanism for Innovation Ability**

As an important link in all kinds of teaching work, the evaluation and feedback of teaching work is of great significance to improve teaching work and promote the healthy development of teaching work. Different from the examination of curriculum teaching, the teaching of scientific research innovation ability training focuses on the evaluation of the formation and development of students' innovation ability. It is very important to establish and perfect the reasonable evaluation standard of professional innovation ability in order to promote the development of professional innovation ability training of research group. After several years of practice of the research group model, the evaluation of the cultivation of students' professional innovation ability should be observed and evaluated from the angles of thinking ability, practical ability, innovation development level and daily performance. There are six judgment bases, that is, whether the students have the ability to analyze and solve problems; whether the students have mastered the methods of carrying out professional innovation activities; whether the students can make rational use of all kinds of professional equipment and resources; whether the students can sum up and reflect on their own professional innovation activities; whether there is a new development of students' innovation ability; Whether the student obeys the instruction teacher arrangement, actively participates in the teaching activity, has the cooperation spirit. Usually, the research group will evaluate the student training at the end of each semester according to the above six judgment principles, and improve the professional innovation ability training of the research group according to the evaluation results, correct the problems and adjust the problems. Student training program. We should always ensure that the ability training program meets the needs of the development of students' professional innovation ability, and the training process does not go through and is not mere formality.[4]

## **4.2. P: 50% the Spirit of Delving+30% Strict Logic+20% Interdisciplinary**

As an important means to improve scientific research ability, the writing of papers can not occupy an important position in the training mode of graduate students, and is easy to be ignored. In view of this situation, this paper puts forward the following views, hoping to improve the scientific research level of graduate students.

### **4.2.1. 50% the Spirit of Delving**

First of all, a good paper, often six or eight thousand words, long more than ten thousand words, which is usually responsible for many graduate students who are still responsible for a lot of studies is indeed a huge project, but it is a very test of graduate students' perseverance and research spirit. Most of the papers are completed by the students themselves, which determines that the quality of the papers has a great relationship with the students' personal attitude. If the students have enough perseverance to delve into the things they study, then the final results will certainly live up to the expectations of the public. In view of the fact that academic graduate students majoring in design are almost blank in writing papers, the idea of setting up paper groups has been spawned. Because most of the papers are mentors, "one-on-one." "to guide the completion of writing, then there are bound to be a variety of emergencies during this period, the importance of the paper group is self-evident. Different from individual writing, the emergence of thesis group is very meaningful to enhance the academic atmosphere. In this atmosphere, the enthusiasm of students is bound to be improved, and the spirit of research is also more prominent, which is precisely the most important part of thesis writing. In order to arouse the enthusiasm of students, some colleges and universities in our country have published papers in the incentive mechanism. In addition, we can also introduce more academic talents at home and abroad, with their actual experience to encourage graduate students to

write papers; in addition, well-known magazines at home and abroad It is also necessary to introduce, colleges and universities should increase the investment in academic resources, so that students have materials to read. The above methods can greatly improve students' cognition of the meaning of thesis writing and their ability to delve into research, and it is also an important means to improve the scientific research innovation ability of graduate students.

#### **4.2.2. 30% Strict logic**

With the spirit of research, the members of the paper group must also have strict logic when writing the paper. In order to cultivate strict logical ability, we must first learn to analyze problems. The more flexible the brain is, the more flexible it is to speak without thinking about people for a long time. Everything is not a temporary effort, so students have to exercise their own district to deal with what they have to do one day in an orderly manner, so as to form habits and enhance their logical thinking ability. The second is to learn to analyze independently. Data is a very important point of view in the paper to support the material, for those who do not have a source of data must be carefully considered, let alone directly copy other A man's point of view. Finally, it is very important to learn to analyze problems in reverse or multi-angle, to creatively allow any possibility, not to pursue one step in place, to achieve this step, to constantly absorb knowledge and refresh their own cognitive system. For the members of the paper group, they have complete hardware and software equipment, careful teaching by teachers, as well as the encouragement and example support of their companions. If they can cultivate strict logical ability, then no complex paper will defeat them.

#### **4.2.3. 20% Interdisciplinary**

Nothing can exist without other related things, nor can design disciplines. Take the landscape design with good prospect at present, it can not be separated from urban planning, can not be separated from architecture, and these three design majors can not be separated from the support of geography. At the end of last century, a normal school in southern China directly assigned the major of urban planning to the College of Geography, which directly explained the importance of geography to the major of planning and design. When applied to the paper group, it is hoped that the joint paper group of the relevant specialties can be established, each learning from each other's strengths and complementing its weaknesses, and finally achieving the integration and development of the discipline, and it can also be able to achieve the integration and development of the discipline. Expand students' thinking and greatly improve the scientific research ability of the members of the paper group.

### **4.3. E(Exhibition):Terrace+Exchange**

For academic graduate students majoring in design, it is very important to have a good platform for displaying scientific research results. In addition to the platform, good mentors, subject leaders and students are also essential for communication. Based on this, this paper puts forward the following suggestions.

#### **4.3.1 Actively build a display platform**

If colleges and universities want to improve the scientific research level of graduate students, it is necessary to actively construct a diversified project display platform. Through the development of project results exhibition, participate in all kinds of academic exchange meetings, innovation and entrepreneurship annual meeting and science and technology competition and other activities, fully display the scientific research results of students. Combined with the implementation of the project, the project results exhibition is carried out regularly every year, and the selection activities of "my favorite innovation project" and "the best creative project" are held to attract the participation of the whole school teachers and students; select excellent projects, academic papers, participate in the national and provincial college students' annual meeting of innovation and entrepreneurship, promote the inter-school

exchange of the implementation of the project; recommend the excellent project results to participate in the "Challenge Cup""Internet+""Energy saving and emission reduction""Mechanical design" and other comprehensive, professional academic science and technology competition activities to test the effectiveness of the project; hold investment and financing institutions and enterprises field inspection activities, project docking and talks and other activities to help students transform innovative achievements to the ground.

#### 4.3.2 Exchange activities shine brightly

In addition to providing an academic exchange platform, we are also committed to setting up a number of scientific research competitions to encourage students to participate actively, exercise their ability to express themselves and promote exchanges with each other. Take the technical route design competition as an example, we give a research topic to let the students fully understand the background of the research, the purpose is to have the students form a group, each group is equipped with a teacher to guide the technical route of the research, and the students display their design in the form of a report. This activity not only arouses the enthusiasm of students for scientific research, but also improves their expression and reporting ability. In addition, we also recommend excellent students to actively participate in the school. Outside the scientific research competition, from the subject application writing to the report exchange, with the teaching teacher all the whole process instruction, the purpose is to let the student in this kind of evaluation competition, unceasingly stimulates the innovation potential, enhances the expression ability in an all-round way.[6]

## 5. Conclusion

Creativity is the most effective medium because it is everywhere. Every day, we are moved by creative products, stories, information and experiences, creativity has a broader and comprehensive impact on individuals, corporate culture and urban culture. The design manager and his team should constantly discover the cultural connotation of the enterprise in order to integrate resources and manage resources according to the requirements of the market so as to create a good design scheme. Design management is the control of brand communication, sublimation and design process. Design management is not only the relationship among designers, customers and managers, but also interior design, space design, sculpture design and urban planning. Architecture and other contemporary information electronic technology, interactive design between the "great design" artistic relationship, how to perfectly integrate these resources, fusion is the subject of contemporary design, culture, creativity as a good link between design and designers, how to combine local culture with modern culture, designers are no longer the handyman who must know everything, but the core of the whole design management system. Designers must start from the big design, upgrade the design to the spiritual field, and maximize the design efficiency. [7]

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