

# *Innovation Ability Training in the Architectural Design Teaching*

*—Teaching Reform and Practices of the Designing Courses of Architecture Major*

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**Abstract**—The reform on the architectural education mode is imperative to adapt to the transformation of the construction industry development in our country. Under the new situation, cultivating the architectural design talents having strong innovation spirit and practice capability is the important goal for architectural education. The paper, starting from the teaching reform practices of the architectural designing courses, based on strengthening and cultivating the empirical investigation and research capability as well as the design process control capability of the students, combined with the interactive and enlightening teaching methods, conducts research and obtains better teaching effect, establishes good interactive relationship between the teachers and the students, strengthens the cultivation on the innovation capability of the students.

**Keywords**—*innovation capability; investigation and research; design process control; interaction;*

## I. INTRODUCTION

From the perspective of learning the feature of the architectural major, it is no doubt that the architectural design course intensifies the innovative thinking training. Therefore, the architectural design teaching, as one link of the creation education, should fully respect the creative spirit of the students, based on the creative ideas of the students, help them to enrich and perfect the contents and depth of the plan design, totally repudiating should not be allowed even if the plan is bad. The practices such as replacing the thinking of the students by the ideas of the teachers, or simply denying the design plans of the students owing to various technical reasons tend to frustrate the innovative spirit of the students in the sprouting situation[1]. However, it is very difficult to teach the architectural design well, which needs to teach the students how to make architectural design but also make the students form a group helpful for the development of creativity.

The architectural design process is usually divided into several stages including the earlier period of design, overall idea, detailed design and design expression, while the architectural design innovation lies in finding, analyzing and clearing out the problems in the earlier period, and then grasping the main problems thus to obtain the originality of architectural design and form the plan features. Therefore, the innovation ability training of the architectural design courses

should take emphasis on the two aspects including empirical investigation and research capability as well as design process control capability from the perspective of teaching contents. In addition, combined with the interactive and enlightening teaching methods, conduct some explorations.

## II. EMPIRICAL INVESTIGATION AND RESEARCH CAPABILITY

The combining of the empirical investigation and research with the architectural design can make the students not only possess professional skills but also have stronger adaptation capability, judgment and analysis capability thus to become the talents better adapting to the social development. However, in the traditional architectural design teaching, we always lack in cultivating the empirical investigation and research capability of the students, and neglect the attention to the innovation trait of the students. Many links which can be conducted based on the innovation and learning of the students are replaced by the teachers. The students can only design in accordance with the drafted tasks by the teachers step by step. For example, the topic design specification is an important learning guidance document for talents cultivation, which on the one hand, reflects the teaching level of a department and a teacher, on the other hand, also reflects the problem of teaching orientation[2]. In accordance with the traditional teaching mode, the design specification is formulated by the teachers, in which the room contents and area are regulated clearly, the students just act according to the design specification. This positive thinking really conforms to the general development process of things, but it is also easier to make the students form thinking set thus to restrict the development of the innovative thinking. In fact, some design specifications exist with some problems in the aspects including the scale control, contents setting and principle of site selection, the students will never doubt it under the restriction of the positive thinking. If this trend continues, the students will stick to convention, which causes the neglect of the leading role of the students in the innovative education. From the perspective of social responsibility, the architects should participate in the formulation of the design specification and the feasible research of the project, which should be incorporated into the education contents[3]. Therefore, it is needed to leave some spaces for the students in the formulation of the design specification. For example, in

the teaching process of the architectural design I, when I formulate the topic of “architectural design for kindergarten”, I put forward the total area and the area proportion of the various function divisions instead of regulating the room contents and area in details, as for the setting of the activity contents and area determination, I ask the students to adopt the research analysis methods such as demonstration, memoir, data inquiry and comparison, build several teams to select the architectural spaces to conduct field investigation and system analysis thus to make detailed investigation result reporting, besides, the students put forward many analysis and comments based on the comparison of living examples. In addition, perfect the design specification and guide in the further architectural design. In this way, the students successively conduct deep research and know the requirements of the users thus to put forward their understanding on the design topic, and draft the design specification with rich contents under the overall requirement of the teaching outline, which not only reflects the constant updating of the topic contents, but more important, strengthens the training on the innovation capability of the students in the formulation process of the design specification. It can be seen that the proposition design of architectural design is a very important guiding means for the innovative education.

### III. OPTIMIZE THE TEACHING STEP, AND ESTABLISH THE LEARNING TRACK WITH A VERTICAL AND HORIZONTAL COMBINATION.

The traditional teaching modes of architectural design often include the teaching steps of teaching, demonstrating, practicing and coaching and commenting[4]. The students will know of the basic principle, practice requirements and methods through the teachers’ instructing, and complete the practice according to the teachers’ demonstration and coaching, their homework will be scored through the teachers’ reading and appraising, at last, the whole process of this practice will be ended by unified commenting and appraising given by teachers. This kind of longitudinal learning track with the form of master and apprentice instructing indeed guaranteeing certain teaching efficiency, but is also exposes some problems, such as too much attention paid by the students on scores, relying on the teachers and demonstration works, simplex design thought, lacking of creativity and personality development.

Through optimizing the traditional teaching steps during the process teaching, we have set up a learning track with a vertical and horizontal combination for students, adding some teaching steps of extracurricular reading, visit, discussion, group design, demonstration, view and emulation, summarization and informal discussion conducted combining with subject practice in teaching to set up a transverse communication and study media, forming a interweaving with the originally longitudinal teaching method, so the students’ positivity and initiative get a full stimulation, their personality development gets support and guidance, the learning atmosphere in the process of teaching is deepened, and a brand new teaching situation has appeared.

#### A. *Extracurricular reading*

Self-study ability is the basic ability that university students must possess, and extracurricular reading is the important learning track for the students of major in Architecture. During the teaching, we recommend moderate reference books for students in subject practice assignment book according to every stage of the teaching content to instruct the students’ extracurricular reading, thus to consolidate and enrich the learning contents in the class, which has played an important role in strengthening the basic theory study, knowing of the new tendency of architectural development, increasing the storage content of design examples in the brains, gradually knowing of and mastering the related regulations, enlightening the design thought and deepening the design for students.

#### B. *Discussion type teaching method*

We have arranged some discussing courses in the process teaching to preliminarily train the students for their program description and defense abilities. In the discussing courses, the students should walk onto the rostrum to show the processing results of documents they consulted, blueprint they drew and the working model they made to us, and tell their conception and thinking process, answer the questions proposed by the teacher and other students, and also conduct discussion on some issues[5]. During this step, the teacher will intensively evaluate and inspect the students’ basic abilities of talking and debating, the students’ subjective initiative has been stimulated greatly, and their design thoughts have been broadened and ordered, which achieves the cognition to process.

#### C. *System of design group*

In the teaching, we mainly adopt the method of design group which has the work characteristics of architect to conduct the process teaching. The students of the design group will collectively conduct the work of design research, model production, graphical representation analysis and showing with the mode of labor division and cooperation, they draw on the wisdom of the masses, learn widely from others’ strong points and mobilize from each other to get a more outstanding effects compared with the traditional teaching methods in the aspects of quantity and quality for the design and expressing practice on the premise of the same timeliness.

#### D. *Conduct teaching reform and course construction taking teaching research as the forerunner*

The university teachers should and must stay on the leading edge for the development of their subjects, only by this way can they train out the professional talents needed by the society in the future. Teachers in the teaching group of this subject actively participate in the compiling work of the textbook, conduct the scientific research of the project and participate in the academic exchanges activities. Meanwhile, the teachers deeply conduct the course construction work during their teaching process, conduct the teaching research work surrounding the professional reform goal of education, propose the research direction and outcome by stages, and have got some achievements.

#### IV. DESIGN PROCESS CONTROL CAPABILITY

At present, the development of architecture has generated new thinking mode, namely integrate the modern scientific thinking into the architectural thinking, the purpose of the architectural design transforms from the design process pursuing from the aesthetic development to reasonable solution of the problems to the process of constantly solving the problems and making decisions. The design process in the broad sense refers to the design activity occurred in a design project from planning, feasible research to final entity formation as well as the whole usage process; the design process in the narrow sense refers to the process starting from collecting the design information related to the design tasks to forming complete design graph achievement. In the teaching process of architectural design, the training on the design process control capability is another key point to improve the innovative capability of the students, which mainly embodies in whether the students can find the key problems correctly in the earlier design period, and whether the students can give reasonable solutions to the key problems based on the existing material technology means in the detailed design stage[6]. Therefore, in the classroom teaching process, it is needed to help the students to deliberate the design idea based on the skeleton and work model thus to promote an evolutionary and interlocking scientific process from the establishment of design idea, deepening the design plan to the formation of the design achievements, finally complete the construction of the architectural space and implement the design concept. For example, in the teaching process of the small and medium size architectural design, I transform the node control of the preliminary sketch to the process control of “function space, structural technology and format package”, redivide the design teaching process to the single process control, which not only completely meets with the curriculum requirements but also deepens the training on the professional design capability and innovative thinking of the students with aims.

#### V. INTERACTIVE AND ENLIGHTENING TEACHING METHOD

The interactive and enlightening teaching is the dynamic process of teaching and learning and centers on the participation of the students, which can offer timely suggestions and enlightenment aiming at the specific problems encountered by the students. Owing to the particularity of the architectural design course teaching, the students should positively participate thus to complete the goal. Therefore, it is needed to create a loose learning environment and create the atmosphere of free contest for the students. Under the loose learning environment, the students will have the spirit of self-studying, innovation awareness and innovative spirit. In the design teaching process, I never deny the ideas and plans of the students easily, therefore, the students will constantly put forward new creativity, active thinking is the important situation for innovation cultivation. Meanwhile, it is needed to protect the consciousness and innovation enthusiasm of the students, understand the rat-fuck difference-seeking psychology of the students, properly guide them thus to motivate their innovation enthusiasm, make them possess the possibility of diversified development, deepen the understanding and recognition of the students on architectural

design and improve the teaching quality. This teaching and tutoring process is not the continuous explanation of the teachers but to guide the students to activate their thinking thus to recognize the problems based on their thinking activities. As for the plan modification, the teachers should not simply offer the answers but provide several possibilities for plan development thus to make the students for exploration. And so forth, seen from the outside that the teachers are conducting tutoring on the topic design but in essence, they are constantly motivating the thinking activities of the students thus to make the students experience the thinking activities and gradually improve their architectural innovation capability. In addition, the exchange and discussion among the students is also a part of interactive teaching link, different students have different starting points and different emphasis as well as different solution modes on the same problem. The discussion and even debate among the students tend to generate valuable enlightenment, which is the process of mutual learning.

#### VI. CONCLUSION

In the teaching reform of the architectural design course, I adopt the teaching procedure of “raising problems (investigation and research)-design learning (process control)-classroom discussion-problem explanation(interactive enlightenment)”, based on the actual investigation, establish the good interactive relationship between the teachers and the students and try to promote the design process with scientific design method, which on the one hand can motivate the learning enthusiasm of the students, on the other hand can integrate the design practice link, investigation and research link with the teaching link. The students can obtain the analysis and explanation of the teachers timely in the design practice process thus to make the theoretical contents never hollow for the students understand and accept easier. The teaching reform practice is accepted by the students for them to conduct some beneficial exploration on the teaching mode reform of the architectural design course.

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