Whole Course Practice & Interdisciplinary Integration: Construction of the Teaching System of Environment Design for Application-Oriented Talents

Ye WANG
Sanda University, 2727 Jinhai Road, 10-711, Shanghai, 201209, China

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Abstract. There were lots of problems in traditional teaching system of Environment Design, which led to lack of students' application ability and innovation ability. Facing the opportunities and challenges from the new circumstance, the new teaching system should be founded based on the concept of whole course practice and interdisciplinary integration, in details which included, setting up the curriculum based on developing capability, constructing teaching system with whole course practice, pushing forward the step-by-step enterprise-cooperation practice teaching style, exploring the practice teaching style with interdisciplinary integration focused on developing creativity and building the objective, diversified and proper quantified evaluation system of the students’ work, etc. The practice proved that the methods mentioned above effectively helped improving the quality of application-oriented talents for Environment Design.

Introduction
Under the time of “Internet +”, the intention and extension of Environment Design was continuously developing. The traditional top-down and academic design education has been considerably impacted. The students had acquired a great deal of information through information and interaction technologies, MOOC before they entered the classroom, which affected the teaching style to a considerable extent. The content, style and expression methods of projects had been greatly impacted with the development of the new technologies and media. The traditional concept and teaching style of environment design can’t match the requirements in the new situation. In this context, there is an urgent need to explore a new suitable teaching system to meet the requirements of application-oriented talents.

Problems in Current Teaching System of Environment Design
Environment Design is a cross specialty based on combination of art and scientific holism. It’s made up of interior design and landscape design, which related to architecture, landscape architect, interior decoration design, graphic design and modeling design. It covered natural science, sociology, art and architecture, which resulted in strong comprehensiveness, cross-discipline and practicability. The teaching should be focus on combining theory with practice, which has been well-known. Most of the universities had setup a certain proportion of practical curriculum in their teaching program to develop the practical ability of the students through a series of design courses. This had accomplished a lot but still faces the following problems:

The Curriculum Was Old-fashioned and the Courses Were Isolated, Which Made the Students in Lack of Comprehensive Design Capability
The basic, theoretic and design courses in the traditional curriculum were based on discipline. Therefore, each course had its own structure and training style and the teaching process was focused on delivery knowledge and accompanied with related training, which was isolated and fragmented. The massive major and elective courses without clear target and connection can’t interconnect the knowledge. It’s fully depended on the savvy of students to build integral awareness and overall planning and furthermore, to apply the related knowledge to solve the comprehensive complex
problems. As a result of such curriculum, the students were loose in knowledge structure, lack of knowledge transfer capability and poor in practical ability.

The Practice Teaching System Was Incomplete and It Is Not Clear That the Incremental Relationship in the Practice Ability Training of School-enterprise Cooperation

The current practice teaching style in Environment Design was settled based on separate courses and the training was mainly focused on single simulation course, which was lack in comprehensive and practical. The step-by-step targets in different practice teaching stages were unclear and the content and evaluation system were incomplete. Most of the school-enterprise cooperation was remained on providing some internship and giving some seminar. The further cooperation processes, such like the designer fully involved in teaching, teaching at the job site, real project participation, etc., were short. The school-enterprise cooperation style hasn’t been organically integrated into practice teaching in different levels, so that the practice teaching model hasn’t been competence-oriented.

The Openness of Teaching Content and Style Was Insufficient and Lack of Interdisciplinary and Cross-major Courses, Which Made the Students Lack of Creativity

The teaching of Environment Design was limited in the traditional space decoration design. The curriculum and content were more focused on training of space modeling and representation skills. It had obvious shortage in developing the students in fusing multi-discipline knowledge, follow the interest of art and science, green ecology, health and safety and humanistic community. The teaching activity was mainly constrained within the specialty and lack of interdisciplinary courses and design program, which resulted in lack of imagination and creativity for the students and therefore the improvement of their specialty was limited.

The Evaluation System Was Unilateral and Didn’t Provide Enough Guidance in Teaching and Learning

The evaluation system was the quality control to the teaching and learning and it guided the direction and focus of the teaching reform. Recently, in most universities, the evaluation of the design course was more coming from the final design works and lack of the monitor and evaluation of the process. The evaluation system of the design works didn’t correlate to the capacity structure of application-oriented talents. The evaluation standards were unclear and the subjective factor of the teacher played main role. The evaluation was mainly expressed through display board which is not diversified.

All the problems mentioned above in Environment Design education had greatly affected the quality of the talents development. The teaching philosophy needs reform, which means to start from positioning the target of talents development, then reconstruct the new teaching system to match the target and create teaching style to improve the quality of the talents.

The Concept of Teaching System Reform Based on Application-Oriented Talents Development: Whole Course Practice and Interdisciplinary Integration

The target for undergraduate education of Environment Design was to develop application-oriented talents with innovative thinking and creativity. Therefore the teaching system should be obviously application-oriented.

The so-called application-oriented talents were those who can apply their professional knowledge and skills into the work they engaged. They’re the specialties who mastered the basic knowledge and skills in front line of production and social activities. The creativity of the application-oriented talents reflected in the ability of integration. This contains two progressive levels: firstly, master the basic professional theory and technologies, they can find and analyze the problems in “application” level and then creatively design the solution by integrating and modifying the information and technical resources. Secondly, they can categorize the new problems found in the practice and find out the key of the problem. Then they can originally integrate and develop the professional theoretic
and technical system. By continuous practice, they can finish summarizing, refining and sublimating of the existing theoretic and technic system.

In order to achieve the targets mentioned above, the distinguish feature of Environment Design had to be followed during constructing the teaching system. Firstly, it has to be closed connected with the social demands. The whole course practice has to be the center of the teaching style and the target was to improve the application ability. The whole course practice has two meaning. One is to have practice running through the whole undergraduate education and settle different level of practices corresponding to the stages. Therefore, the practice teaching structure with multiple levels can be formed. Secondly, it means the practice teaching style with entire designing process, i.e., to settle the group courses targeting to develop the core ability according to the required professional abilities for the typical job position and practice with simulation of real case and environment in the enterprise so that the disjoint between teaching and market needs can be avoid to a certain extent.

Furthermore, the design education must be diversified and open. The teaching system should reflect the feature of interdisciplinary integration. The interdisciplinary integration means during the teaching and practice activities, the interaction between multidisciplinary knowledge, the integration of the knowledge modules and teaching by the team with multidiscipline background should be emphasized. Therefore, the teamwork ability among the students and between the Environment Design students and other professionals can be improved. Also their creativity can be improved though this.

**Construction of the New Teaching System with Whole Course Practice and Interdisciplinary Integration**

**Construct the Professional Curriculum Focusing on Developing Competency**

The education of Environment Design targeting developing application-oriented talents should be centered to develop the innovative problem-solving abilities of the students so that they can meet the requirements of the elementary occupation and capable for their future career development. In detail, the core professional abilities should include the followings:

a. Comprehensive design abilities: environmental investigation, design thinking, knowledge integration, proposal design and comparison, detailed design, etc.

b. Expression capability: sketch, cartography, CAD, verbal and oral expression, etc.

c. Aesthetic judgment: aesthetic sense, field of vision, judgment, creativity.

d. Communication and coordinate ability: service sense, team work, professional code and ethics, scope of knowledge

e. Learning capability: question consciousness, autonomic learning, self-development

Into the specific learning stages and courses, these core specialties should be furtherly specified and broken down into target with different grades. The professional curriculum based on detailed capabilities was divided into three major blocks, such as professional core courses, expression skills courses and professional theory/technology courses. On the different stages of professional teaching, focusing on major professional design courses and targeting at the professional design capabilities, different kind of course group was formed with related courses of theory, technology and expression skills. Furthermore, the teaching was focused on design programs and projects. The content was integrated through solving the practical problems. The students were guided to apply what they have learned, including knowledge, skills and methods from all the courses, in different stages of design and turn them into their own thoughts to solve practical problems. Therefore, the isolation and disconnection between the courses can be effectively avoided and the content can be deeply planted into their minds. This helped the students to integrate knowledge, skills and methods and better develop their core professional capabilities.

For example, in the professional basic courses of Environment Design in Tianjin Fine Art Institute, targeting developing the capabilities of observation, form imagination and spatial creativity, the basic design curriculum combined with vision, form and architecture was formed through integrating the traditional courses like “Design sketch”, “Modelling basis” and
architecture experience”. This method helped fostering the students’ innovative consciousness and guided them entering the professional role gradually, which was a good reference to others [1].

**Construct Whole Course Practice Teaching System and Introduce the Incremental School-enterprise Cooperation Style**

According to the target, the feature, the cognitive law of the students and requirements of the professional skills for Environment Design, the practice teaching was designed into three levels, basic practice, course practice and comprehensive practice. Different kinds of school-enterprise cooperation were introduced in corresponding levels so that the practice teaching style was connective, step-by-step, well-arranged, reasonable and running through the whole undergraduate education stage.

Basic practice teaching was to organically integrate the fundamental skills with professional applications during the teaching of fundamental courses, through which the students was intended to apply the fundamental knowledge and skills to express their ideas and develop professional thinking during their freshmen stage. In this level, the professionals from enterprise were invited to give seminar on developing professional quality, industry trend and the culture of design enterprise to help the students understand the business model in full scale.

The course practice teaching for sophomore and junior students was project teaching style. The teaching was usually centered on each courses, combining design projects and competition subjects, to develop the students’ ability to analyze and solve problems. It’s usually involved the whole design process, which included market (site) investigation, pre-analysis, case study, concept design, scheme design, design expression and public defense. The series of course practice not only helped students to master the design methods and expression skills, but also developed their capabilities in oral expression and team work. In this level, the enterprise designers cooperated with teachers in different stages of the course and introduced the full design procedure, professional code, project experience and most recent software through different kinds of activities such as seminar, case study, one-on-one mentoring and evaluation of the work. Through the above method, the academic teaching seamlessly joined with the practice and the application ability of the students was improved.

The comprehensive practice teaching was mainly refer to the comprehensive design, professional practice and graduation project for the senior students. In this level, the practice teaching had more interaction with social activities. Studio teaching mode was introduced, in which students participated in real projects and acquired advanced knowledge in professional field. The “Two-Supervisor” system was introduced into the graduation project and the students were encouraged to finish their work in enterprise, where the comprehensiveness and practicability were more important. At same time, in order to improve students’ innovation ability, the cross-disciplinary practice teaching activities were taken according to the “General Design” concept.

**Explore the Interdisciplinary Integration Teaching Style Targeting Developing Innovative Thinking**

Nowadays, there were more and more complex problems in design work, such as energy and resource crisis, economic globalization, aging and health, etc. The boundary between design and those disconnected disciplines, such like psychology, economy and sociology, had become more and more blur and their connections had become more and more stronger, especially for the industry of creative design which was affected by “Internet +”[2]. This required the “General Design” concept during the talents development and emphasize the interaction and integration between disciplines from different levels. Therefore, the students can have better integration and innovative thinking to better meet the needs of social progress.

In the field of cross-discipline education, the d. school style of Sanford University was well noticed. The courses of the school were open to all the graduate students of Stanford University (the students had their own professional background and fundamental capabilities) and the collaboration cross the department was encouraged. The purpose of this was to deepen the degree
education of each specialty through broadening their design thinking. Focusing on developing innovator, education was to dig out the potential creativity of each students and bring them the confidence to innovate. The teaching was guided by the problems in real world and paid more attention to reality. It was driven by projects and focused on practice and related value goal. The boundary in the traditional thinking should be broken and collaboration and interaction should be emphasized” [3]. All these experiences were valuable for us to learn and use for reference.

The teaching style with interdisciplinary integration can be demonstrated in the reform of the curriculum, practice program and training and the teaching group. Cross-discipline Electives and seminars can help students in many ways, such like to understand the content and extension of design from different point of views, to widen their field of vision and scope of knowledge and to expand their thinking. In the practice teaching, the comprehensive practice courses, which were subjective, interdisciplinary and cross-grade, were created. And the members of the teaching group included teachers, designers, technicians and enterprise experts with multiple background and expertise. The topic was closely connected to the hot social problems, such as green design, renovation of old building, renewal of community environment, etc. This helped to stimulate the responsibilities of the students, guide them to pay more attention to the social progress and solve the actual problems with professional skills.

Explore the Objective, Diversified and Proper Quantified Evaluation System for Students’ Work

The design work of students was the major outcome of the teaching and learning. Therefore, the evaluation should as far as possible to be clear, objective and proper quantified so that the direction and value orientation of teaching and learning can be correctly guided and the target can be reached.

For the first step, the teacher summarized the important knowledge points or the skills to form the evaluation standard according to the target. The teaching steps and the content were designed focusing on these knowledge points and the standard was integrated into the guidance of the design proposal at different stages. Therefore, the students were guided to pay more attention to these knowledge points and apply them into their design proposals.

At mean time, the evaluation standard should cover the whole learning process and the students were requested to keep the entire documentation of every steps to finish their design work, such as information collection, materials organization, investigation and survey, case study, the idea sketch, interactive discussion and results display. The documentation was also included into the evaluation system which can help to monitor the design process, build good working habit and professional thinking. The students were guided to pay more attention in daily learning and control the progress.

At the review of the final work of course design, open evaluation of the whole grade was carried out. The evaluation group was formed based on teaching group and besides the faculty adviser (group), the judges were also including other teachers and enterprise supervisors. All the students were provided with equal opportunities to demonstrate their work and creativity through interactions with the judges. This helped to avoid unilateral evaluation from the faculty adviser from a certain extent and be more objective and diversified. It also helped to motivate the students’ sense of honor, create professional atmosphere and improve the communication and learning between each other.

Practice and Accomplishment

Based on the concept of construction the teaching system mentioned above, the reform practice had been actively carried out in Environment Design of Sanda University in recent years and remarkable accomplishments had been achieved.

In the reform of curriculum, the course group of “Interior Design” was centered at the series courses of interior design and integrated with “Environment Design hand-painted techniques”, “Computer graphics techniques”, ”Decorative materials and applications”, ”Interior furnishings design”, ”Lighting design”. The course group of “Landscape Design” was centered at the series courses of landscape design and integrated with “Landscape research methods”,
“Landscape plant configuration”, “Environmental facilities design”. The teaching focused on design thesis and divided the whole design procedure into the teaching segments. Through explanation of design theory, engineering technologies and representation, the students were guided to learn as doing and their application ability had been improved.

The incremental style had been carried out in multi-level practice teaching activity through bringing expertise, competition and project into classroom. In the course teaching of interior design and landscape design, the enterprise cooperation had been carried out with multiple design companies of interior design and landscape design in the past continuous years. By applying real projects, the full-time teacher focused on introducing principle, methods and conception proposal while the part-time teacher from enterprise focused on practical experience such as standard drawing, how to apply materials to realize the design ideas and software skills, etc. University and enterprise set up the teaching resources library together. The enterprise also provided facility for on-site teaching activities. The evaluation standard of the students’ work was created by both sides and both sides participated the open review of the final work so that the evaluation was more objective and diversified. The connection between academic teaching and requirements of the professional position was realized through this enterprise cooperation which greatly helped the students to improve their professional capabilities and competency.

The innovative ability of the students was developed through combining the teaching activities in and out of class. The course teaching was organically combined with design competition and projects of “Creation and Entrepreneurship”. All the full-time teachers and some part-time teachers from enterprise got involved into the coaching work which promoted the winning rate and the prize grade in the competition. In the practice teaching of “exhibition design” in the 6th semester and “Comprehensive design and representation” in the 7th semester, the subjective comprehensive practice thesis was settled and the students were encouraged to team with students of other majors, such as visual communication design, product design, etc. to finish the projects, through which the abilities of comprehensive analysis, cross-major collaboration and team work were developed.

In the recent five years, the reform of the teaching system effectively improved quality of the talents. The students had won more than 40 prizes in the competition and exhibition in local and abroad. The employment in design industry was above 60% and the students were well recognized by the design enterprise. The reform had also improved the specialty construction. There were 4 courses granted with the name of key courses of Shanghai. “Environment Design hand-painted techniques” and “Landscape Design” were granted as the excellence courses of Shanghai in 2013 and 2016 respectively. In 2016, the Environment Design passed the Shanghai professional assessment of undergraduate education in the first group of Sanda University.

Summary
Nowadays, the education of Environment Design had developed from an application modeling art with complete teaching system into an interdisciplinary subject. Under this situation, the reform of the teaching system for Environment Design had to be carried out. Through optimizing the curriculum, constructing the practice teaching structure, creating the teaching style and forming the evaluation system, the professional teaching system with whole course practice and interdisciplinary integration had been formed, which focused on developing the students’ professional capabilities of problems solving and creativity. This was an effective way to improve the quality of the application-oriented talents.

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