

# The Orientation of Experimental Teaching Reform in View of Industry Development

## The Curriculum System Reform of Art Major of Lanzhou Jiaotong University under the Background of Industry Development

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**Abstract**—Aiming at problems that the teaching of art design major in our country lags behind social requirements, start from establishing practice teaching idea of art design major, mainly research on how to mobilize initiative and enthusiasm of students in this major to participate in science and technology studies and practice innovation. Implement talents training mode of art design major that integrates “teaching, innovation, competition, industry, university and research”, continuously explore and improve talents training mode in art design major and enhance employment competitiveness of professional talents.

**Keywords**—teaching; reform; industry demand

### I. INTRODUCTION

For problems that the current art major in China “pays attention to art and attaches less importance to technology” and it cannot meet the requirements of industry development, tracing it to its source, we find that it is because the teaching idea is trite, the teaching method is dated, the characteristic of subject is not distinct and it does not introduce enterprises into education. The knowledge structure and teaching system of existing curriculum cannot meet social development and requirements of the era. Lanzhou Jiaotong University takes culture and art industry development as background, deeply researches the requirements of industry development, carries out major curriculum system reform, implements talent training mode that integrates “teaching, innovation, competition, industry, university and research”, promotes the learning of students to become autonomous, research-based and innovative, effectively promotes the comprehensive ability of students and conforms to requirements of industry development.

Lanzhou Jiaotong University looks at the organic integration of learning, science, art and technology and takes practical teaching reform as the breakthrough of high-level innovative talent training mode reform; breaks through the barriers of curriculum and subject, integrally optimizes and systematically reconstructs three-dimensional and open

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practical teaching system; breaks through the limitation of practical teaching construction by dividing curriculum, major and department, makes overall arrangement and integrally builds practice teaching platform with integration of software and hardware; combines with regional culture characteristics, depends on national level, provincial and ministerial-level projects and independent innovation project, builds learning mode with high-end guidance, multiple interactions and combination of “teaching, innovation and competition”, and effectively improves students’ practical ability of independent innovation.

The curriculum system reform of art major with industry demands as the guidance in Lanzhou Jiaotong University strives to take “project oriented curriculum, creation practice and production of works” as the core of educational reform, fully trains students’ creative spirit and technical applied ability and cultivates compound applied talents with broad scope of knowledge, high quality that can meet the requirements of industry development.

### II. TEACHING REFORM

#### A. “Teaching” and “Learning”

Revise training program and teaching plan of design major, define main courses of major curriculum system and raise the proportion of practical teaching. Timely revise and write high-level teaching materials and solve problem that the contents of teaching materials are dated. Introduce enterprise resources into schools, set up platform of practical teaching; introduce industry projects into teaching to make major courses become project oriented; introduce industrial standard into teaching evaluation system, realize production of works and establish practical major curriculum system. Project teaching with series of courses as the integration breaks through the limitation with single course as the implementation object. When students complete the learning process of contents of series of courses, they complete integral practical project and realize interaction between various teaching links.

Establish practical teaching system of spatial formula with “five combination, four platforms and three levels”.

“Five combination”: organic combination of theoretical training and operational ability; organic combination of teaching link and scientific research; organic combination of experiment on campus and base outside school; organic combination of traditional culture and modern expression; organic combination of science and technology support and artistic aesthetics”. Comprehensively realize multiple integrations of target, channel, place, object and means.

“Four platforms”: through various experiments in daily life, it forms incubation platform of teaching reform achievements, practice platform for students’ innovation and entrepreneurship, scientific research and case development platform, social consulting and service support platform, to realize effective regurgitation-feeding and interactive mechanism of experiment on teaching, scientific research and industrialization development.

“Three levels”: according to three levels of basic experiment, comprehensive experiment and independent innovative experiment, implement opening and sharing experiment teaching with multiple layers, flexible time and abundant crowd, improve service efficiency of instrument and equipment, opening degree of laboratory and demonstration service level.

Base on the outline: firstly, meet course experiments with 25 projects and 518 credit hours annually prescribed by the outline; meet the requirements of graduation design of about 240 people annually in teaching plan, provide basic teaching service for cultivation of qualified designers. Take special topic as characteristics: actively cultivate and support characteristic experiment project of special topic of teachers and students, such as intangible heritage craft experiments of painted sculpture in Dunhuang, dyeing technique experiment of Silk Road, virtual image experiment of motion capture. At present, these projects acquire program of scientific research at national level. Take innovation as the breakthrough: combine university students’ practical entrepreneurial innovation project at all levels, provide innovative experimental service. In recent years, it completes 48 innovative practice projects of college students at school level, participates in “Science and Technology Park Cup” entrepreneurial innovation contest, incubation of project fundamentals of college students’ entrepreneurship competition in Gansu Province; combine with various professional competitions, provide technical services and platform support.

Teachers play the roles of designer and stimulator in teaching to encourage students to actively participate in the discussion. The case evaluation for design works has function scale and aesthetic dimension. Take cases as the core, analyze characteristics through experimental data and realize summary of basic data. It keeps foothold on teaching achievement of case teaching, “exploration and practice on case teaching that runs through the whole process of art design talent training”, which is accepted by the provincial Education Department. It won the departmental award of teaching achievement prize in 2011.

Construct tutorial system training system in art major, adopt educational mode of “teaching how to fish, interpersonal communication and free space”, and meet individualization

cultivation of “teaching students in accordance of their aptitude, teaching by personal example as well as verbal instruction” in art and design education, fully realize classified cultivation; meanwhile, it inherits humanities characteristics of “inheritance from master to apprentice, teaching by personal example as well as verbal instruction” of traditional art education. Keep a foothold on teaching achievement of tutor management, “research on theory and practice of “tutorial system” in art design talent training”, which is accepted by the school. It won the second prize at school level of teaching achievement prize in 2013.

#### *B. “Innovation” and “Research”*

Use transformation of achievements in scientific research to develop a series of comprehensive and innovative experimental curriculum. Take interaction of “industry, university and research” as the core, strengthen practice teaching, construct top new framework of practical teaching that faces all the students in art major, runs through the whole course of teaching, strengthens the cultivation of creation and innovation ability, introduces production process into teaching, and cultivates students to comprehensively use knowledge to analyze and solve problems of creation as well as cultivates their innovation ability. Strive to achieve common progress and development of students’ innovation ability and actual operational ability. Students can independently design experimental target and plan, or only give task goal without limitation of plan form to solve problems, give students sufficient creative space, and cultivate students’ ability to comprehensively use knowledge to analyze and solve problems of creation and the spirit to use experimental study to explore science.

The educational reform takes art elements in Dunhuang and culture of Silk Roads as the highlights, excavates regional culture characteristics and inherits intangible cultural heritage, actively creates national level, provincial and ministerial-level projects and platform of independent innovation. Use transformation of achievements in scientific research to develop a series of comprehensive and innovative experimental curriculum. Use high-level innovation project guidance to drive students to participate in teaching link of practice and innovation.

Aim at avoiding that the art and design education has industrial standardization problems of teaching system and idle theorizing of design results, pay attention to strengthening combination of science and technology and art design, combination of regional culture and art design as well as combination of commercial function and art design. The induction mechanism of entity projects that takes horizontal enterprise project as topic of graduation design, takes longitudinal scientific research project of teachers as daily characteristic topic strengthens applicability and commercial character of practical link, lets practical accomplishments accept actual enterprise inspection and commercial inspection. Lead in entity projects to make it become organic characteristic link formed by “industry, university and research” link of experiment teaching.

### C. "Competition" and "Industry"

Create and implement training mode of "integration of practical teaching, innovation project as well as science and technology competition", through learning of a series of innovation education course and preparation process for competition and competition process for high-level competitions, provide opportunities for all the students from freshman to senior to carry out creation and innovation activity in the whole course, and stimulate students' innovation consciousness, establish innovative thinking, gradually cultivate, exercise and improve innovation design ability.

Take five discipline competitions at national level (advertising art competition of college students, innovation cup computer competition, industrial design competition, animation game design contest and environment art competition of college students) as breakthrough point to form unique practice-oriented teaching model with integration of "learning, industry and competition". And summarize guidance, organization and selection mechanism related to other discipline competitions. Organize and guide students to widely participate in discipline competition, put teachers and students on national competition platform of talent cultivation in this major. It has double meaning to promote students to learn actively and improve teaching level of teachers. The relevant achievement of educational reform about "research and practice on 'teaching, innovation and competition' of talents in art design major" won first prize of the university and departmental award of education in 2015.

The educational reform depends on cultural industry innovation of Silk Road and gets the approval of a number of major projects of national social science, innovation project and social sciences of Ministry of Education. Teachers and students participate in competitions such as national college students advertising art competition, design art exhibition of young people, university student extracurricular academic science and technology competition and achieve excellent achievements. The achievements of educational reform are widely acknowledged by students, industry and enterprise and society and have large application and promotion value.

## III. EXPERIMENTAL TEACHING REFORMS

### A. Experimental Teaching Idea and Reform Thinking

Establish new experimental teaching idea. When keeping a foothold on characteristics of experimental teaching resources, refer to advanced experience of domestic and foreign excellent art academies in carrying out innovation practice education base, pay attention to benign interaction of experiment teaching and reality of art development, and attach importance to cultivating students' innovation consciousness and spirit of exploration, and promote students' personality development.

Formulate clear experimental teaching positioning and reform thinking. Take experimental teaching mode, experimental contents and reform of experimental management mode as key points. Strengthen "four consciousnesses" of students, namely consciousness of originality, reform consciousness, environmental consciousness and employment consciousness. Improve "five

abilities", namely artistic innovation ability, artistic skill, art appreciation and analysis ability, employment ability and artistic research ability.

### B. Build Practical Teaching System with Students' Independent Innovation as the Principal Part

Take "professional, interlinked, open and service" practice teaching idea as the guidance, aim at characteristics of different disciplines, construct multiple function modules such as painting, sculpture, design, animation and photography, and implement teaching of different levels and stages.

### C. Strengthen Combination of Experiment Teaching and Application Practice

Practical teaching adheres to the purpose that "uses practical teaching to promote scientific research and uses scientific research to improve creation level", fully mobilize and exert dominance of teachers on experiment teaching, integrate scientific research project of the school and social application practice in contents of experiment teaching, let students become participants of projects, and realize organic unification between experiment teaching of art and social practice.

### D. Establish Open and Diversified Examination and Evaluation System

According to requirements in different stages of the experiment, lay particular attention to examination and evaluation of different stages: Firstly, creation examination and evaluation for artistic innovation ability; secondly, performance examination and evaluation for artistic ability; thirdly, summary examination and evaluation for art appreciation ability and analysis ability; fourthly, achievement transformation for employment consciousness and employment ability; fifthly, reference management for artistic research ability.

### E. Environment and Safety of Experiment Center

1) Integrate experimental platform in and outside school and realize resources sharing: The experiment center of school of art and design consists of 7 research laboratories, 1 times art museum, and 1 Silk Road museum of dyeing and 20 studios. The center will serve five professional experiment platforms to integrate, realize educational resources sharing and reach scientific and reasonable experimental area, space and layout. Besides, computers in laboratory connect with campus network to realize digital and informatization management; the experiment center reaches good cooperative mechanism with laboratory of other colleges in school, in order to furthest integrate experimental resource in school.

At present, the colleges has signed an agreement of 15 practice bases and handed out shingle, including practice base of scenery and scenic spot for sketching practice, all kinds of companies in upstream and downstream of advertising industry, manufacturing enterprise of industrial product, film and television group as well as municipal engineering research institute. Practice bases outside school can hold more than 600 students at most every time. Take curriculum integration as the

leading role to realize multiple integration of resource in and outside school.

2) *Start to use integrated management system and realize intelligent management*: Through integrated management system of laboratory at laboratory management office, the experiment center uses digitization and information means to manage experimental environment, establishes electronic standing book to provide operating platform for laboratory management and open independent experimental teaching, provides technical guarantee for quality control management of experiment teaching, provides daily informatization management platform for experiment teaching, in order to realize intellectualization of resource management.

3) *Respect achievements of knowledge and intelligence and create humanistic environment*: Experiment is the basis of science. The center respects achievements of knowledge and intelligence, advocates innovative progress and pays attention to construction of humanistic environment. The center pastes outstanding scholars in this field and aphorism of famous persons on the wall of laboratories; regularly hold exhibition of achievements of innovative experiment activity of students such as innovation experiment program of college students and discipline competition; hold scholars' forum; let teachers and students fully feel the charm of science and stimulate their enthusiasm in learning and scientific research.

#### IV. POSITIONING OF CHARACTERISTICS OF EXPERIMENT TEACHING REFORM

##### A. *Depend on Recourses of Engineering Course in Lanzhou Jiaotong University and Strengthen Project Properties of Experiment of Design Class*

The development of design science cannot do without basic support of engineering. Any product with attractive appearance must realize its utility function firstly. Without human body engineering, man-machine engineering and structure of mechanics of materials, the design product cannot be anything but castle in the air. Modeling major of art products and environmental design major directly served by laboratory demonstration center plan to carry out penetration and integration of multidisciplinary intersection with college of mechanical and electrical engineering, transport college and school of architecture in the school, deliberately add elements of engineering experiment, optimize modeling design of mechanical products and space environment design experiment, insert in experiment teaching contents such as vehicle design, internal and external space environment design of vehicle, guidance and logo design in transport service place, design system, unit (parts) or technological process that can meet the requirements, develop, choose and use appropriate technology, resources and modern technology tools and strengthen project properties of experiment of design class.

##### B. *Lay the Root of Local Cultural Advantages and Compact Cultural Connotation of Experiment of Design Class*

Design science needs solid engineering background to realize functional beauty and beauty of technology. But the aesthetic category of design products includes formal beauty,

artistic beauty and ecological beauty. Formal beauty and artistic beauty come from extraction and abstract of formal language of all things. Because of different time and space, the reveal of formal beauty and artistic beauty needs to depend on specific cultural soil. Only through gripping characteristics of local culture and compacting cultural connotation of experimental project can experiment teaching of art design in local colleges become "practical". The center plans to take excavation of national, folk and local culture as key point in cultivation of experimental project in the center, intensifies the inheritance of intangible cultural skills on Silk Road, continues to design and develop characteristic experimental projects on topics such as painted sculpture in Dunhuang, dyeing on Silk Road and Lanzhou calabash, strive to get project approval of scientific research at national level.

##### C. *Keep up with the Development of Digital Technology and Realize Technical Transformation of Experiment of Design Class*

Pay close attention to dynamic condition of disciplinary development, timely update means, methods and contents of experiment teaching and meet the requirements of talent cultivation of informatization design. Adapt to profound changes from traditional arts and crafts to digital design to the current informatization design, as well as changes happened in denotation and connotation of design discipline, grasp the trend that detailed division of labor of modern machines and development of computer intelligent software make the manual work of handicraft replaced by machine production, pay more attention to innovation of design and acceptability of the market, continuously update hardware and software of scientific teaching of digital information in design major, accelerate the construction of laboratory of virtual motion capture, allocate basic equipment and software required by experiment teaching in animation major, promote technical transformation of experiment of design class in the center and furthest develop the intelligence of designers.

#### V. CONCLUSION

Curriculum system reform of art major with industry development as the background lets "teaching, innovation, competition, industry, university and research" run through the whole process of curriculum system reform, mobilizes teaching enthusiasm of teachers, improves students' creative thinking and operational ability, enhance the quality of talent cultivation in design major. Major curriculum system reform takes real practice of real projects in the industry as the characteristics, strengthens cultivation of students' operational ability, innovation ability and creative spirit and improves the quality of talent cultivation. Outstanding graduates in design major have become backbone of the industry. Some students have certain influence in the industry. The achievements acquired by curriculum system reform of design major in colleges of western countries play a very good demonstration effects on Colleges in China. The establishment of new system vigorously promotes reform of talent training mode and major construction and conforms to the needs of industry development. Teaching reform will base on conforming to industry development, seek more systematic ways of reform to

cope with competition, gradually form teaching advantages and take the path of differentiation development.

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