Explores of the Urban and Architectural Cognitive Practice Course under the "Three-three System" Education Model Innovation

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Abstract

With China's industrial restructuring and the increasing important role of information and knowledge industry in recent years, talents nurtured under the traditional educational mode are not able to meet the needs of the society. Nanjing University has began to implement the 'three-three system' education model featured with 'three phases' and 'three paths'. The new model proposes to fulfill the requirements of the new standards through innovative education. The first two stages are able to develop a student's general knowledge of a topic and provide a base for choosing a professional field that they are interested in. Then in the final stage the students are able to cultivate their knowledge and apply it through, academic research, an interdisciplinary lens and finally an employment lens. Based on this model, the undergraduate teaching curriculum of urban and rural planning at Nanjing University has conducted a 'discipline-oriented to student-oriented shift' reform including the course, urban and architectural cognitive practice. Within this course students apply their understanding of architecture and urban form to real world situations by visiting sites throughout China, and meeting professionals in the field. This paper systematically reviews and analyzes the new teaching philosophy, constructive goals and practical content of this newly designed course. Students in this class are motivated to seek out their interest through, writing research papers, drawing and learning how it applies to an actual career in urban architecture. Through the newly created 'three-three' cultivating course on architectural cognitive practice the three new features of this course are effectively building a student's professional academic ability, interdisciplinary capacity and the entrepreneurial ability--thus providing a useful reference to the teaching reform of the urban planning curriculum.

Key Words: three-three system; cognitive practice; cultivation of students

1. Brief introduction of the 'three-three system' education mode

Educational mode for undergraduates differs a lot in different countries. American educational mode is well-known for its general education phase. The mode aims to offer guidance to help students form values honored by the general public and develop qualities that can help them live a better life. British undergraduate educational mode strengthens the learning of basic knowledge and theory while it also sets comprehensive subjects for students to polish their learning ability and thinking mode. The mode in Australian pays attention to cultivating students' analytical and reflective abilities as well as spirit of

suspicion. Major, minor and elective courses are set to satisfy both the professional needs and students' self-interest.

The common educational mode for undergraduates in China usually focus on nurturing students catering to the needs of society. With China's industrial restructuring in recent years, which means the leading role in industry has turned from secondary industry to tertiary industry and the increasing important role of information and knowledge industry, talents needed by the society turn from graduates with rich knowledge and skilled technics to those with research ability, reflection capacities and innovative initiatives. In order to correspond to the change and at the time get over the inherent defect of traditional educational mode that neglects students' individual talents by exerting a 'streamline production' method, Nanjing University in 2009 implemented a new round of undergraduate education reform in all dimensions. The new model explores how to cultivate talents by combining the general education with broad professional education. The main goal of this new model is to establish a new system for nurturing talents that meets the new requirements of national undergraduate education under new social and economic conditions. This mode of study characterizes general education and individualistic training. It gets the name 'three-three system' by implementing three cultivating phases with three development paths. It divided the curriculum into three modules——general, specialized and optional courses, in addition to three development stages which are 'general, professional and multiple training' and three individualistic development paths, namely 'professional academic study, multi-disciplinary learning and employment and entrepreneurship '(Fig1). The 'three-three system' turns out to be a huge success and the students nurtured under this new mode are much more innovative and can really find a path that caters to their own talents. In 2014, the new mode was awarded the National Higher Education Grand Prize for its outstanding teaching outcomes. This was the first time universities in Jiangsu Province have received the prize for in last two decades.

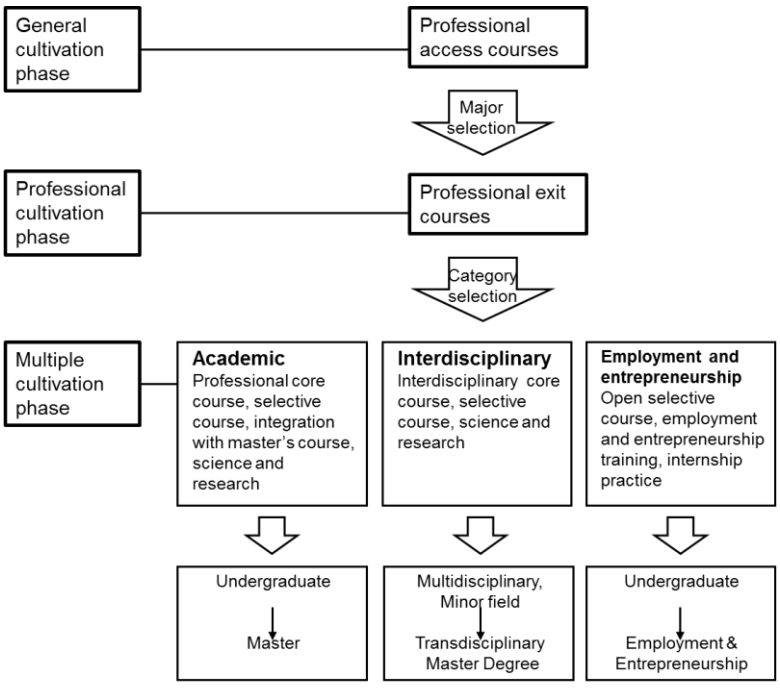

Figure1. Diagram showing Nanjing University's 'Three-three system'

The 'three-three system' educational mode can be generalized as the consilience of undergraduate educational subject development, general education with individualistic cultivation and expanding upon their foundation with intensification of practice. The general idea is to render students with broader choices by insisting on general education, interdisciplinary construction and the renewal of cultivating talents. Once entering the University, the undergraduate enters the 'general cultivating phase'. During this phase the undergraduate chooses general courses offered by the different departments. Then, after self-determined options and satisfying the 'standard for entering the major', the student goes into the 'professional cultivating phase', consisting of platform courses and professional courses. At this stage, the student's professional foundation is consolidated by the teaching of the most basic professional knowledge and research methods. After the completion of the two phases, the undergraduate enters the 'multiple cultivating phase' which is designed to help the individual decide on their career development path. During this phase, the student should meet the 'requirements for graduation' on one hand and choose the most appropriate path for his/her own development based upon the three development paths.

2. Urban and Architectural Cognitive Practice Course under the 'Three-three System' Educational Mode

2.1 The new course trend——putting students first

The Urban and Architectural Cognitive Practice Course at Nanjing University was established in 2005 and is taught in the form of summer school for student of sophomore standing. During this course, teachers along with the students visit different cities to see famous architectural structures and blocks, judging their merits and defects. This course enables students to do space research on a big scale, which means they can successfully transcend the threshold of professional learning from a very narrow point of view, to a more comprehensive way of thinking. It is taught at the key point when students transfer their learning from lessons more concerned with single architectures to curriculums about urban design planning. This course borrows from other universities with backgrounds in architecture that focus on the practical tradition of architectural studies. Centering on architectural cognition and sketching which reinforces that the major part should be the observation and experience of students whilst teaching should be auxiliary. It not only enhances the sophomores' emotional cognition of cities and ignites their enthusiasm for professional learning but it also establishes a platform for exerting an imagination of urban space design and promotes students' ability to think independently while acquiring the skill of drawing.

Since the implementation of 'Three-three System' educational model in 2009, the Urban Planning undergraduate curriculum system has undergone reform and innovation. Before the implementation of the new model, the Urban and Architectural Cognitive Practice Course only paid attention to the integrity and relevance within the urban planning curriculum system and held the idea of putting subject development as the most important. Now it centers on establishing a new teaching system most appropriate for students' future development under the guidance of the three development paths. As the

course is taught at the 'professional cultivating phase', its major task is to guide students to go out of the classroom and integrate with the rapid urbanization reality, enhance their professional knowledge and skills and improve their comprehensive qualities.

2.2 The new aims of the course based on the 'three paths'

2.2.1 Aim 1: A solid professional academic foundation

Aim 1 enables students to master the basic ideas and methods of urban and architectural cognition systematically. These ideals are developed within the academic cultivation stage. It helps to improve their scientific thinking and expression by writing an academic thesis from a perspective out of the cognitive practice as a way to further their understanding of urban planning theory. This aim lays a solid foundation for the establishment of the 3D space concept of urban planning.

2.2.2 Aim 2: Cultivation of interdisciplinary interest

Aim 2 is developed within the second interdisciplinary cultivation stage. During this stage students' broaden their international horizon as well as inspires and exercises students' comprehensive capacities and qualities to discover, analyze and solve problems. The urban planning practice explores students' learning potential in interdisciplinary fields such as society, economy, architecture, history and ecology.

2.2.3 Aim 3: Enhancement of employment and entrepreneurship consciousness

Aim 3 allows students to grasp the method of solving real problems in urban planning and design preliminarily. Developed during the last cultivation stage, its aim also strengthens their team spirit through group learning activities such as; appreciating good examples of architectural cognition and critiquing bad ones. In addition, it improves students' awareness of employment opportunities and entrepreneurship by making exchanges with urban planning, design and management units and holding vocational trainings by inviting good planners.

2.3 Newly-added content embodies the coordination of head with hand

With years of accumulation, the course has formed a cognitive route in Nanjing as its basis, radiating Shanghai, Anhui and Zhejiang Province and southern Jiangsu Province, covering many professional knowledge and skill point in terms of urban planning and architectural design. It combines the method of classroom instruction, field cognition and sketch as well as discussion and debate. The 'classroom instruction' stage centers on reviewing excellent urban and architecture examples both domestic and abroad, the Nanjing Master Plan in particular, so as to let students understand the methods to research and evaluate cities and architectures preliminarily. The field 'cognition and sketch' part is major for students to get a deep emotional cognition and systematic understanding of urban and architectural characteristic of typical Chinese cities, cities in the Yangzi River Delta in particular. It not only enables students to learn theory and skills from the master planning and urban design angle, but also helps students summarize experience and lessons by paying attention to the relationship among city, architecture and nature as well as the urban construction and development path. The discussion and debate' part is the

specific implementation of putting students first. Instead of following the traditional teaching way of 'teacher talk and students take notes', it encourages students to see more, listen more, think more, talk more and draw more. By holding discussion meetings and on-site question-answering, it forms a benign interaction of equal exchanges and mutual learning between teachers and students and sublimates the teaching outcome of cognitive practice. Therefore, the specific implementation of the course not only promotes students' perceptual understanding of urban and rural construction and planning, and improves their sketch and drawing skills, but also fully exercises their abilities to comprehensively think and evaluate urban and rural development problems.

Table1 Practice spots of the Urban and architectural cognitive practice course

City	Professional knowledge and skill practice places
Nanjing	Nanjing Urban Planning & Exhibition Hall, Xuanwu Lake Central Park, Ming City Wall, Institute of Urban Planning & Design, Nanjing University, 1912 District, Nanjing Library, Jiangning Weaving Mansion, Xinanli District, Former Residence of Gan Xi, Nanbuting Community, The Confucius Temple The Yuhuatai Martyrs Cemetery, Chenguang 1865 Innovative and Industrial Park, Xianlin University Town, Jiangning Fangshan University Town, Jiangning Masterland Residential Area, CBD in Hexi, Olympic Center, Landscape Belt along the Riverside
Shanghai	Shanghai Urban Planning & Exhibition Hall, Xintiandi District, Greenland along Yan'an Eastern Road, No.8 Bridge Innovative and Industrial Park, Tianzifang artistic and Industrial District, The Bund & Lujiazui CBD, Pudong New District, Zhangjiang High Technological and Industrial Park, Hongqiao Comprehensive Transportation Hub
Hangzhou	Hangzhou Urban Planning & Exhibition Hall, The Xihu Lake, Qinghefang Recreational District, CBD in Qianjiang New District, City Balcony
Suzhou	Suzhou Museum, The Humble Administrator's Garden, Suzhou Singapore Industrial park, Ligongdi Area, Scientific, Cultural and Artistic Center in Suzhou
Zhanjiang	Dashikou Square, Jinshan Temple
Yangzhou	Shouxihu Lake, Geyuan Garden, Western District of the New City
Hefei	Baohe Landscape District, European Street in Economic Development Zone,
Huzhou	Nanxun Historic Town

3. New features of the course under the 'three-three' educational mode

Under the background of 'three-three' educational mode reform, the urban and architectural cognitive practice course has undergone profound changes and has formed its own characteristics. It conforms to the multiple cultivating aims put forward by the new model and corresponds to the 'three development paths' by exerting three different ways of assessment. That is, handing over research paper on a specific

topic, comprehensive practice report and individual atlas of sketches and drawings. By doing so, it pays attention to the cultivation of students' professional academic ability, interdisciplinary quality and employment and entrepreneurship capacity.

3.1 Cultivation of professional academic ability

The course enables students to learn the development sequence, land use layout and spatial structure. In addition to allowing them to perform academic research on making comparison and critiques about the specific problems arising from urban and rural construction. Therefore, one of the assessments is to require students to hand over an academic research paper on a certain topic with one of the urban and rural construction perspectives. The paper should basically reach the standard for publication, which means it has a wisely-chosen topic, enough evidence and standard format. This part accounts for 30% of the total grade.

Table 2 Academic research topics of the course

Topic	Professional knowledge and skill practice places
Urban development Line & Public participation	Nanjing, Shanghai, Hangzhou Urban Planning & Exhibition Hall
Urban public green field & landscape and tourism district construction	Xuanwu Lake Central Park, The Yuhuatai Martyrs Cemetery, The Xihu Lake, Greenland along Yan'an Eastern Road, Baohe Landscape Distrct, Shouxihu Lake, Geyuan Garden, The Humble Administrator's Garden, Landscape Belt along the Riverside
Urban recreational block construction	1912 District, Xintiandi District, Qinghefang Recreational District, European Street in Economic Development Zone, Ligongdi Area,
Urban historic and cultural protection	Ming City Wall, Xinanli District, Former Residence of Gan Xi, Nanbuting Community, The Confucius Temple District, The Bund, Nanxun Historic Town
Urban industrial park construction	Chenguang 1865 Innovative and Industrial Park, No.8 Bridge Innovative and Industrial Park, Tianzifang artistic and Industrial District, Zhangjiang High Technological and Industrial Park, Suzhou Singapore Industrial park
Urban CBD construction	CBD in Qianjiang New District, CBD in Hexi, Lujiazui CBD
Urban university town construction	Xianlin University Town, Jiangning Fangshan University Town
Urban large public facilities construction	Hongqiao Comprehensive Transportation Hub, Olympic Center

Urban planning values abstract thinking and logical deduction. Thus, rationalism should be taught within the first stage of the 'three-three system.' As a result, similarity and relevance are considered in choosing the practice locations for students to visit and evaluate. On one side it helps students strengthen the cognition of one aspect of urban and rural construction and on the other side, it imparts them with the

opportunity to make horizontal comparison and better grasp the general laws behind urban and rural construction. Students can combine their interest with emotional cognition and focus on one aspect to conduct rational research. The hot topics chosen by students are those of leisure block construction, historic and cultural protection and innovative industrial park planning. They are good at discovering problems by making spatial comparisons between different cities with similar elements. The course is designed to arouse students' interest in abstract thinking and research by making comparisons among real examples. This course offers guidance for them to form the ability of deep observation and analysis as well as critically think -- laying a solid foundation for further academic development in urban planning.

3.2 Cultivation of interdisciplinary capabilities: Writing of comprehensive practical report

Through this course, urban planning has revealed its independent and complete content while being separated from the field of architecture. This course has fully used the advantages of Nanjing University's resources of its comprehensiveness in subjects and its goal to lead students to learn more about architecture, geography, economy, history, ecology, sociology and landscape (Table3). As a result, the testing requirements of the course urges students to write the comprehensive practical report by using the methods of document referencing and group discussion. The report should be very logical, with robust content as well as figures detailing the principles of urban and rural planning as it relates to interdisciplinary knowledge. The score of the report accounts for 40% of the final result.

Table3 Interdisciplinary knowledge within the course

First-level Discipline	Professional knowledge and skill practice places
Architecture	Urban Planning & Exhibition Hall, Nanjing Library, Jiangning Weaving Mansion, Jiangning Masterland Residential Area, Former Residence of Gan Xi, Jinshan Temple, 1912 District, Xintiandi District, Qinghefang Recreational District, City Balcony, Olympic Center, Suzhou Museum, Scientific, Cultural and Artistic Center in Suzhou
Geography	Xianlin University Town, Jiangning Fangshan University Town, Pudong New District, Chenguang 1865 Innovative and Industrial Park, No.8 Bridge Innovative and Industrial Park, Tianzifang artistic and Industrial District
Applied Economics	Zhangjiang High Technological and Industrial Park, Suzhou Singapore Industrial park, CBD in Qianjiang New District, CBD in Hexi, Lujiazui CBD
Landscape Architecture	Xuanwu Lake Central Park, The Yuhuatai Martyrs Cemetery, The Xihu Lake, Baohe Landscape Distrct, Shouxihu Lake, Geyuan Garden, The Humble Administrator's Garden
Chinese history	Ming City Wall, The Confucius Temple District, The Bund, Nanxun Historic Town
Ecology	Landscape Belt along the Riverside, Greenland along Yan'an Eastern Road
Transportation Engineering	Hongqiao Comprehensive Transportation Hub
Sociology	Xinanli District, Nanbuting Community

By analyzing their reports, we find that students have the desire to explore the knowledge and skills of relevant fields initiatively. For example, through the cognition of large infrastructure, modern residential areas and ancient architecture, students have grasped the method of valuing architecture by seeing architecture and its surroundings as a whole, thus being more familiar with detailed design and performance techniques of urban architecture. It can also lay a good foundation for those who are interested in transferring their major to architecture. Through the cognition of the Nanbuting community—the typical example of urban renewal in Nanjing, the students put forward the 'golden key' (a comprehensive method involving both space regulation and management) for dealing with the complicated property ownership, subject gambling problems and contradictions arising from historic community renewal by using the theory and methods urban planning, sociology and even law comprehensively. The report based on the research named 'Research of the contradiction of old urban community renewal——An example from Nanbuting Community in Nanjing' has got an award in the philosophy and social science category of the 13th competition of undergraduates' after-school academic and scientific works in Jiangsu province and has been recommended to attend the national 'Challenge Cup' final.

3.3 Cultivation of employment and entrepreneurship: Submission of personal drawing atlas

Since the implementation of 'three-three system', the course has consciously cultivated students' employment ability and entrepreneurship in their early stages. This has been achieved by the introduction of specific planning projects that helped them understand the working content in the future. This aroused their interest and motivation of learning along with furthering their operational ability through the completion of the personal drawing atlas (account for 30% of the final result) independently.(Fig2)

Figure2 Personal drawing works

In order to enable students to set up the realization of job seeking and entrepreneurship as early as possible; speeches, exchanges and site visits of urban planning units have been organized to help them

learn the development and tendencies of employment. Also, several elites in urban planning and management have been invited to talk about their experiences in terms of work and quality requirements for seeking jobs or starting a company along with giving professional moral and value trainings.(Table4)

Table 4 Employment and entrepreneurship awareness embodied in the course

Major content	Professional knowledge and skill practice places
Understanding of the project	Urban Planning & Exhibition Hall, Jiangning Masterland Residential Area, Former Residence of Gan Xi, 1912 District, Olympic Center, Xianlin University Town, Pudong New District, No.8 Bridge Innovative and Industrial Park, Suzhou Singapore Industrial park, Xuanwu Lake Central Park
Presentation exercise	Outcome presentation
Vocational education	Vocational education lectures about urban planning management and design
Environmental experience	Institute of Urban Planning & Design, Nanjing University

4. Conclusion

If we consider the current urban and rural planning teaching system under the guidance of the National Steering Committee of Urban and Rural Planning Education[i] in China as a vertical line, then the urban and rural planning education teaching system in Nanjing University under the 'three-three system' is more like a horizontal line that connects other subjects to students with different development needs. Of course, the educational aims of 'three-three system' can only be achieved by the cooperation of all the subjects and urban and architectural cognitive course is just one example that made an appropriate and quick adjustment under the new system. Thus, as a common professional course, the urban and architectural cognitive practical course still focuses more on laying a solid foundation of academic research and professional skills along with encouraging students to make a proper selection among different development paths while paying less attention to exerting the idea of 'putting students first'. We have already got plenty of positive feedbacks from teachers, students and schools about the practice of the course and we hope that the exploration of this course can offer valuable reference to the construction of urban planning and relevant subjects.

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[i] The committee is established as an official institution to guide the development of urban planning teaching in China.