

Reflections and Methods of Urban Design Course Under Inventory Context

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Abstract—Urban construction, at present, has transformed from incremental and spatial expansion to the inventory improvement, generating a variety of requirements at different levels for employees to obtain a pattern of design thinking, a structure of design knowledge and a coordinated ability across multiple professions. Urban design course, as a main element of central disciplines, e.g. city planning, architecture, and landscape architecture, should adopt corresponding alterations. Through the development of instructional contents, the innovation of teaching methods and the integration of urban design theories and course, teaching information will be effectively offered, thereby improving students' ability to cope with complicated problems regarding the improvement of inventory urban space from diversified perspectives.

Index Terms—Inventory planning, increment planning, urban design, inventory context, diversified contexts.

I. INTRODUCTION

With the emerging impact of new-round urbanization, the developmental model of domestic urban areas requires transformation. In July 2014, Anjun Sun, the Minister of Urban and Rural Planning Department of the Ministry of Housing and Urban-Rural Development, suggested that current urban planning should change from incremental to stocking design, from previous addition to subtraction. The effective use of stocking space has been a critical way to transform urban development, improve the structure of urban functions, as well as to improve environmental quality and cultural contents. Under the circumstance, traditional incremental cities, which are based on spatial expansion, started transforming to stocking urban design with quality improvement. According to Some Instructions on Furthering the Management Urban Design Published by the State Council in February 2016, it repetitively emphasizes the improvement of urban design and the support of the institution of higher learning for developing professional teams in this regard [1].

A. The Macro Background of Research: China's Urbanization is Facing Transformation

With the urbanization of China's cities entering the transition period, the incremental development potential of China's relatively developed cities is getting smaller, and development and upgrading problems appear in the process of

urbanization. The previous outward expansion constricted the space of urban increment development, while the comprehensive improvement of urban functions requires the major spatial carrier of urban and rural construction to transform [2]; consequently, urban construction has transformed from incremental and spatial expansion to the inventory improvement.

With the concept of inventory planning being put forward, approaches for utilizing the land in the central urban area rationally and effectively has become a concern of domestic scholars and planning practitioners [3]. From the perspective of urban development, the incomplete nature of space resources will certainly limit the outward expansion of cities [4], and the development and emphasis on stock planning will also be the inevitable trend of China's urban development in the future. Although most cities in China are still in the stage of incremental progress, as a planning practitioner, they should consciously step out of the existing working methods and reflect the inventory planning thinking in urban planning. The urban planning model should also achieve the transformation and innovation from "incremental expansion" to "stock optimization".

B. The Theoretical Background of Research: Increment Planning and Inventory Planning

Incremental planning refers to planning based on space expansion for new construction land. At present, such planning is still the mainstream of urban planning in China. Its characteristics are distinct property rights, relatively simple interest relations, and basically led by the government, which can fully reflect the will of the ruling party [5].

Inventory planning promotes the optimization and adjustment of the function of built-up areas by means of urban renewal. Under the situation of tight municipal development space, increasing the proportion of inventory planning has become an inevitable choice for urban planning [6]. It is characterised by the decentralization of the right to use construction land in the hands of land users, complex rights relations; the government cannot dispose of land at will, land redevelopment benefits need to take into account all parties. Therefore, inventory planning requires the participation of government, community and market participants, taking into consideration the interests of all parties. When the focus of urban planning shifted from incremental to inventory, the difficulty will be laid in the redistribution of benefits. The simple spatial design is difficult to solve realistic problems, and system design is needed. The importance of planning supporting policy research will continue to enhance.

Both increments and inventory are important means to deal with urban development problems. The logical relationship

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between the two concepts should be clarified so that the increment and inventory can cooperate and help each other. Inventory planning are adjustments and redistributions of existing interests. The increment is the distribution of benefits. Inventories are benefits, and reductions are compensation for benefits to promote the implementation of inventories and reductions.

In conclusion, the new situation of the sector and academy requires more for the instruction and talent training of urban design. As a main element of central disciplines, e.g. city planning, architecture, and landscape architecture, it should follow the developmental trend of the industry [7], thereby improving the quality of urban stocking space, improving spatial contents and features, as well as integrating the instruction and implementation of urban design, in order to break the shackle of conventional teaching methods, which requires more consideration.

II. THE TRANSFORMATION OF PROFESSIONAL DEMANDS

A. *The Transformation of Design Thinking Patterns*

Inventory spatial design, compared to increment planning, is more complicated, characteristic of various methods, multitasks, diversified elements and sophisticated mechanisms, demonstrating the transformation of urban functions and reorganization of land use. Conventional design based on materials fails to fit in with the complexity of increment design with right subjects and different interest groups, together with the challenges accompanied by these factors. It not only requires employees to have innovative thinking and design patterns, but also to reform urban design instruction, teaching philosophy and contents in universities, so as to cope with complicated problem from diversified perspectives in incremental urban space [8]. It adopts integrated and diversified methods to improve students' ability to systematically analyze the issue, thereby tackling complex problems in the future design, and attaining the transformation from focusing on spatial design to studying urban problems.

B. *The Transformation of Design Knowledge Structure*

The core element of inventory planning is no longer spatial planning, but the reorganization of urban functions and benefit structure, which requires employees to be familiar with relevant contents in regard to laws and regulations, approval processes and interest allocations, as well as to sufficiently analyze the requirements for land use of the government, land owners, market bodies, thereby developing appropriate strategies to balance the interest of all sides. As a consequence, the instruction of urban panning ought to be modified with the contents related to laws, economy, sociology and politics. It aims, for one thing, to improve students' designing ability, and, for another, to enhance their capabilities of interaction, demonstration and social mobilization.

C. *The Transformation of Design Techniques and Methods*

The developmental model of inventory design requires

more for planning techniques and methods, breaking the monotonous aspect of conventional techniques [9], but adopting coordinated mechanism with compound methods, and changing from the focus of experiences to the concentration of dealing with real issues supported by data [10]. It requires employees apply techniques to analyze all the operations and factors of all interest groups, infrastructure, business services, and to demonstrate and stimulate urban physical and social spaces in a more detailed manner, thereby acquiring a virtual understanding of developmental and operational logic behind spaces. As a consequence, it is required to break the restriction of conventional teaching methods that focused on material designs, therefore leading students to master new techniques, concretely analyzing the land use of inventory spaces and the features of the population, activating inventory spaces and urban areas, and realizing exquisite urban designs.

III. THE FEATURES OF URBAN DESIGN INSTRUCTION UNDER INVENTORY PLANNING CONTEXT

A. *A Consistent and Coherent Curriculum System*

Urban design course is set for advanced undergraduate with a rich storage of professional knowledge; it is highly comprehensive, and can be divided into two sections, i.e. theories and design practice. In terms of teaching orders, the instruction of conventional urban design theories cannot connect well with design practice. In the training programs of certain universities and colleges, the two sections are separated into two terms. Due to the separation and lengthy time gap, the theories that students have acquires would become faint, unable to be practiced in the design practice course [11]. Contrarily, inventory urban design requires more for employees to acquire better knowledge scope and practical ability. In this case, it is required to prioritize inventory space design, thereby better integrating and connecting urban design theories with the practice course in terms of contents and time. It should take "site design", "urban design" and the "overall urban design" of graduation project as core elements, and maintain coherent curriculum system through combining the principles of landscape design, site design, resident area design as well as economic and political courses. Meanwhile, the teachers of theoretical courses should be encouraged to participate in design course in an effective manner. Both theoretical and technical courses ought to be integrated to make the teaching contents to be utilized in design course, thereby better fulfilling the professional and inventory-oriented training plan.

B. *An Interactive Teaching Method*

The conventional teaching methods of urban design have led to a lack of cognitive experiences about the realistic restriction behind planning strategies as well as interactive experiences. With the purpose of enabling students to acquire a complete understanding of the coordinated and balanced spatial development of urban elements like economy, society and surroundings, it is required to break the cramming teaching in conventional urban design instruction with students passively receiving relevant knowledge. The course

should prioritize students as the core factor, consider teachers as guides, apply interactive teaching methods along with other means, and develop diversified teaching plans so as to promote better coordinated strategies with all sides being considered and to allow more participants to join the process. In theoretical course, it is required to consider questions as core element, adopt the form of discussion and interactive communication, thereby enhancing students' learning interests and creativity, promoting their professional abilities in inventory design and achieving optimal teaching effectiveness. In regard to the instruction of urban design course, it needs to adopt appraising methods with multiple dimensions during each step, evaluated by the joint efforts of teachers and students.

C. An Open and Cooperative Teaching Field

The conventional teaching field has mainly been classrooms and courses, whose teaching process has been restricted by teaching spaces, thus being quite passive. Facing the transformation of inventory design, it is required to an open and cooperative designing and practicing platform with the support of united teaching and organizational internship, thereby forming a teaching field characterized by diversified, interdisciplinary and cross-region with the fulfillment of social inventory design. Additionally, the Internet is another crucial method to construct an open and cooperative teaching field, which can break the restriction of physical space and the demarcation between teachers and students, and can make use of information platform to collect teaching cases, principles and excellent examples, together with the instructional resources like students' eminent works all previous terms. This aside, it is needed to select relevant contents of news and policies concerning urban inventory design, therefore helping students to acquire essential elements in substantial and fragmented information on the Internet, improving the consistent innovation and dynamic management on the teaching platform of urban design, and completely promoting the width and depth of teaching fields. In so doing, students will be allowed to acquire more professional knowledge during the learning process, and to form an overall perspective of urban design under inventory context.

IV. THE TEACHING STRATEGIES OF URBAN DESIGN COURSE

A. The Teaching Strategies of Theories

1) Compound and complex teaching contents

The traditional teaching contents of urban design theories have revolved around material spatial forms, a radical departure from the demands of urban inventory spaces. Under the context of inventory design, it is urgent to introduce multidisciplinary contents into instruction, covering such knowledge scopes like relevant laws and regulations in regard to urban construction, and the management of storage and property values. Inventory design has no longer prioritized financial interests, but obtained a systematic consideration of the capacity of city transportation and public services, etc. It contains such properties like various methods, multitasks, multiple subjects and complicated interest requirements. As a consequence, the theoretical instruction of urban design ought

to concentrate more on such contents regarding strengthening economy and policies, including urban economics, land economics, institutional economics, and relevant law, regulations and public policies. This aside, in terms of the improvement of theoretical and analytical abilities, it is required to connect with the principles of these aspects like site design, landscape design and neighbourhood planning. In regard to the advancement of technological innovation, it is required to introduce such curricula like the physical experiments of architectural and urban environment, the principle and application of the GIS, and the expressive techniques of city planning, thereby stimulating students to ponder over the problem of urban inventory spaces and laying a solid theoretical foundation for inventory design.

2) Question-oriented case studies

Question-oriented case studies refer to that teachers offer targeted questions or let students discover problems on their own, providing sufficient space for them to discern and cope with the issue, which can help them to acquire new knowledge and skills. With the purpose of dealing with students' lack of solutions and thoughts for particular issues in the conventional theoretical instruction of urban design, it needs the introduction of case studies in the theoretical teaching, and the analysis of typical and prominent cases. By doing so, students can be guided to discern and analyze typical issues and phenomena inside and outside the country, including the evaluation of inventory urban design as well as the implementation and efficiency of urban planning. The discussion of these issues stimulates them to think independently and to study existing urban problems, and to help them to discover and tackle issues with various means in a deep and gradual manner. Additionally, it requires students to develop research reports with feasible solutions regarding the issue.

3) The situational stimulation method

Since situational stimulation can be defined as practical, interactive, cooperative and intriguing, it has been widely applied in the professional instruction among universities. The conventional teaching contents of urban design theories have concentrated on material spatial forms, which has been in accordance with the requirement of domestic urbanization. The urban design under inventory context is associated with the interest groups, e.g. government, developers, property owners, and urban residents. The diversified stances and interest requirements enable situational teaching to be particularly suitable for urban design instruction under inventory context. By situational teaching methods, concrete arguments and situations attended by multiple sides can be achieved to allow students to acquire authentic experience, balance the interest of all sides, and get familiar with the coordinating process under inventory context and in the implement of urban design programs (as is shown in table 1). It is to cultivate students' abilities of discerning, analyzing and balancing the interest of all sides, knowing the authenticity and feasibility of inventory urban design, with the purpose to consider the interests balance as the main indicator for future material spatial planning.

TABLE I: DIFFERENT SIDES IN THE SITUATIONAL STIMULATION

Characters	Requirements
Government	To ensure public interest and social equality; To promote urban sustainable development as well as environmental and resource protection.
Developers	To maximize economic interests and investment return
Property Owners	To protect their interests and acquire financial compensation
The Public	To improve residential conditions, construct convenient service networks, and implement fundamental infrastructure and relevant service equipment
Designers	To meet the requirements of top designs, adhere to relevant regulations, coordinate the interests of all sides and develop designing strategies

B. The Teaching Strategies of Theories

1) The teaching strategy of curriculum design

The project selection and settings of conventional incremental urban design is usually based on the spatial expansion of urban construction, including new town planning, industry planning, projects focusing on critical infrastructure, and functional area planning like tourism and ecological cities. The major spatial carrier of future urban and rural construction has been altered, with the tendency to rely on inventory space [12]. With the purpose of improving students' employment competitiveness, the project selection in universities should be in accordance with the trend. Such projects ought to be offered, e.g. inventory spaces, the improvement of old town construction, the protection of historical blocks, the redevelopment of previous programs. It is required to guide students, through the technical methods of urban innovation, recreation and management, to master the ability to promote, manage and design constructed areas [13]. The project can be analyzed in two perspectives: for one thing, the features of land use and design should be transformed, e.g. the innovation and alteration of old urban areas; for another, without changing the property of previous land use, industries should be improved by introducing cultural innovation, artistic designs, and scientific expositions, etc [14].

2) Participatory planning with multidimensional and balanced perspectives

The traditional teaching methods of urban design have merely focused on theories and instruction without sufficient practices and interactions being considered. As the interests of urban inventory spaces become increasingly complicated and separated, and the increase of public consciousness, it is required to allow enough participation into instruction. Sufficient open teaching methods will enable students to develop multidimensional and balanced mindset, initiate strategies and plans by appropriate discussions of projects. It can change the conventional teaching methods in which students only concentrate on results of design plans and neglect relevant issues during the process. The integration of cross-regional joint designs, the instruction of international

workshop and studio, organizational practical teaching, the introduction of lectures and seminars, in which teachers, students, community individuals and government officials can exchange their opinions, can help students to participate into interactions, thereby changing the previous design model to act blindly. Students, with their participation into the activities, will acquire a complete understanding regarding the requirement of land use of the government, land owners, and market participants; by balancing the interests of all sides with spatial strategies, they can regulate and respond to urban design plans according to the change of their interests. Meanwhile, it is required to invite community individuals, government officials and professional designers to take part in the interactive achievement evaluation for designs, with the purpose of learning from others' strengths and examining whether the course is effective.

3) The detailed design under new digital environment

Compared to incremental design, inventory design requires more for the demonstration and design quality of existing land use. To fulfill the requirement of inventor urban design to possess advanced technological aids, it is required to get more operational data, stimulation and analysis.

It is needed to instruct students to further master technical methods in regard to inventory urban design during the teaching methods, in order to better cope with the new task of urban and rural construction. In the initial research, such newly-emerging statistics, e.g. cellular signaling data, Baidu word frequency data, the POI, the density of public movements, are collected into the GIS platform so as to research and design the complicated issues regarding urban inventory spaces and the ambient elements. Under the new digital environment, students can apply traditional sketch layouts and spatial quantitative analysis into urban designing, in order to reorganize and integrate urban spaces, explore existing resources, develop unique spaces, thereby improving the feasibility and effectiveness of designing plans, and concretely utilize featured resources.

V. CONCLUSION

During the process of urban construction, incremental design has slowed its pace, and inventory design has been a mainstream, which requires for urban design employees to obtain new skills. It is the issue facing the instruction of urban and rural planning and requires its teaching methods to initiate relevant regulations and changes. During the teaching process, it should focus on such features, e.g. various subjects, multitasks and the complicated requirements of interest, so as to integrate and promote the teaching contents and methods in urban design theories and practices, by which a complete curriculum system with an organic combination of theories and practices can be developed.

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