

# Preliminary Study on Environmental Design of Traditional Villages Based on Post-use Evaluation Theory—Taking Xia'an Village, Liuwang Town, Qingdao as an Example

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**Abstract:** Traditional villages are the main components of regional residential space environmental planning and development. Under the influence of the rapid development of cities and the demands of diversified functions, the blindness, pattern and other related problems faced by the development of traditional villages are more obvious. This article studies on the basis of respecting regional environment and culture, Taking the environmental design of Xia'an village in Liuwang town of Qingdao as an example, post-use evaluation theory has been applied to the investigation, analysis and research of the overall environmental features, functional requirements, environmental facilities, cultural inheritance and protection of traditional villages. The author puts forward system design strategies for the above problems, which provide important theoretical basis and design guidance.

**Keywords:** Traditional village, Post-use evaluation, Integrity, Regional culture, Sustainable design

## 1. Introduction

According to the Strategic Plan for Rural Revitalization (2018-2022) issued by the Central Committee of the Communist Party of China and the State Council, this plan is guided by General Secretary Xi Jinping's important exposition of "agriculture, rural areas and farmers", and makes phased plans for the implementation of rural revitalization strategy according to the general requirements of prosperous industry, ecological livability, civilized rural customs, effective governance and affluent life<sup>[1]</sup>. At present, with the accelerating progress of urbanization, rural revitalization and development driven by industrial economy often leads to blind follow-up and copying, which leads to the destruction of traditional village buildings and surrounding environment, waste of resources and lack of regional culture. Therefore, the construction and development of traditional villages should respect the regional environment and culture, and realize the micro-renewal of village environment by holistic and protective means and methods. Through design and research, we can promote the construction and revitalization of traditional villages, enhance the functionality, comfort and experience in traditional village environment, excavate and inherit regional cultural characteristics, drive local economic development and benefit one side with the people.

Post Occupancy Evaluation (POE) is a research method to analyze and evaluate existing buildings and environmental spaces from the perspective of users and experiencers. The use of post-evaluation theory came into being in 1960s. Due to the development of environmental spatial diversity, the complexity of its research objects and conditions is increasing, and the evaluation criteria are gradually improved<sup>[2]</sup>. Through the practical work of domestic and foreign researchers and related designers, and combined with the book "Post-use Evaluation" written by Preiser et al. in 1988, it can be defined as: Post-use evaluation theory is a systematic and strict evaluation process of buildings and environmental space after being used for a period of time. Through comprehensive investigation and analysis, this research uses POE theory to evaluate the whole village at present. According to the advantages and disadvantages of the village status quo obtained from the evaluation, this paper puts forward the corresponding design methods and strategies to achieve the overall improvement and promotion of the village environment. This evaluation data and design method can provide theoretical basis and guidance for the next stage of scheme design. (As shown in Figure1).

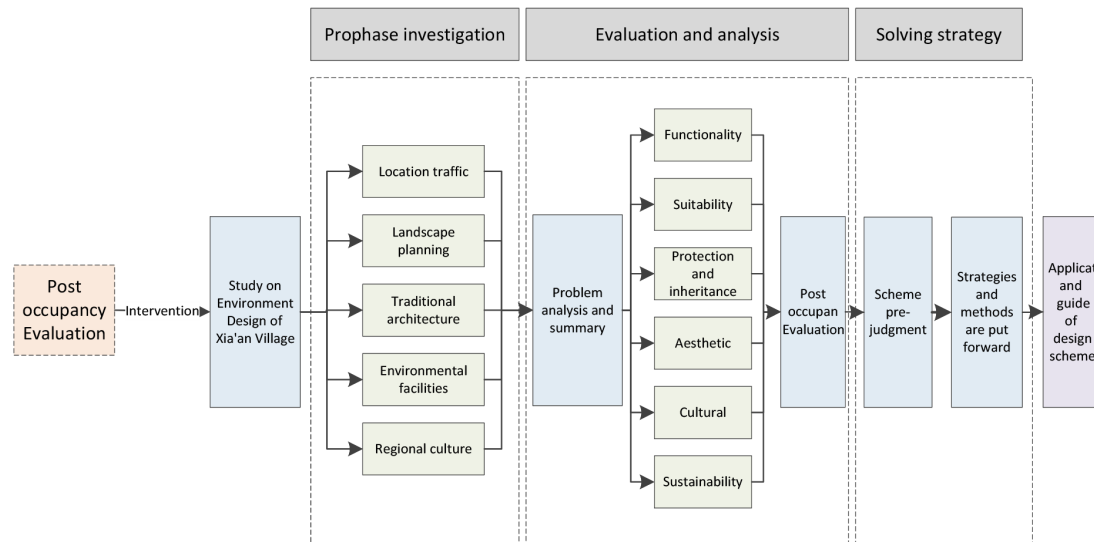


Figure 1: Technology Roadmap



Figure 2: Current situation map of Xia'an village

## 2. Overview of village status quo

Xia'an Village is located in Liuwang Town, West Coast New District, Qingdao City, Shandong Province, on the west side of Tiexian Mountain, with hilly terrain as the main terrain. Located in the north temperate monsoon region, it belongs to temperate monsoon climate. Abundant rainfall, moderate temperature and four distinct seasons. The village has a long history and profound cultural heritage. According to the Republic of China edition of "Adding and Repairing Jiaozhi Territory", it was called Xia'an Village in Daoguang of Qing Dynasty, Dishui Village in Xuanton and Xia'an Village in Republic of China [3]. After liberation, the village was referred to as Xia'an for short. (As shown in Figure2、 Figure3 and Figure4 )

Through visits and investigations, the surrounding environment of the village is basically good, with high vegetation coverage, wide vision and pleasant scenery. At present, the elderly and children are the main living groups in villages, and the proportion of youth groups are small. The architectural form and planning pattern of the village basically retains the original appearance of the village. However, based on the investigation, it is found that there are still some problems of the current environmental planning

of villages, such as: the lack of overall environmental planning in villages, and the obsolescence and lack of public facilities: Fuzzy regional cultural characteristics; New architectural forms invade the original features of damaged villages.



Figure 3: Village field investigation

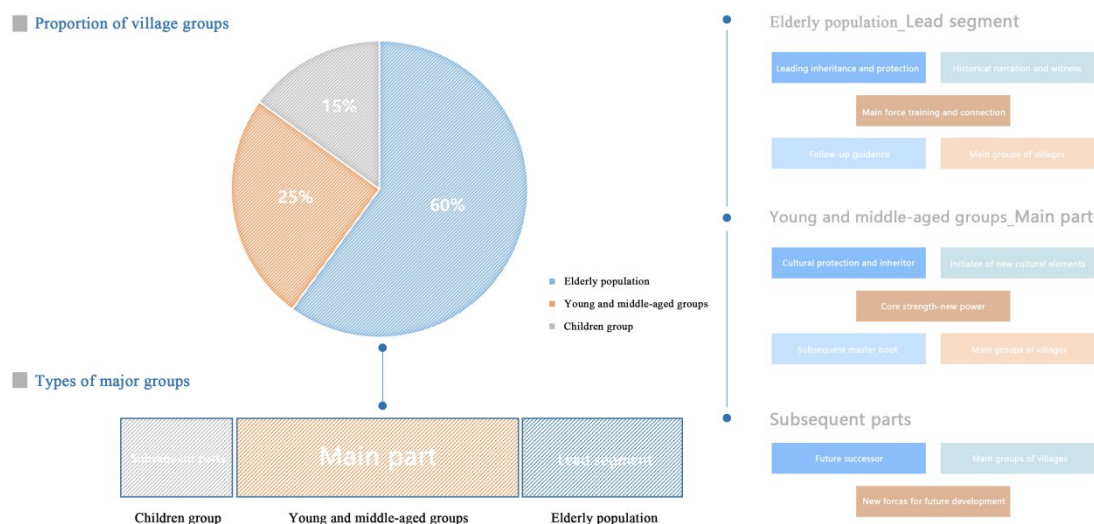


Figure 4: Analysis chart of village group structure

### 3. Analysis of audience groups

#### 3.1. Overview of group structure and organization

There are more than 50 households in Xia'an Village, with a total of about 130 people. The surname is mainly Dai, in addition to Song, Wang Xing, Liu and other surnames. Through on-the-spot investigation, it can be seen that the groups in the villages are basically villagers in the village, and there are few immigrants from other villages. Most young people go out to work and farm, which leads to the majority of the elderly in the village staying behind, while the children and youth are few. Comprehensive quantitative analysis shows that the proportion of young and middle-aged groups in the village is about 25%; the proportion of children is 15%; the elderly account for 60%. However, Young and Middle-aged groups as the core force of traditional village construction and culture, cultural inheritance and protection should belong to them, But this part of the group accounting for the least proportion. How to promote the inheritance and development of village culture and the optimization and upgrading of industrial structure through the micro-renewal design of traditional village environment, attract young and middle-aged migrant workers to return home to start businesses and develop, and promote local regional

economic development. It is the key direction and task goal of this design research topic.

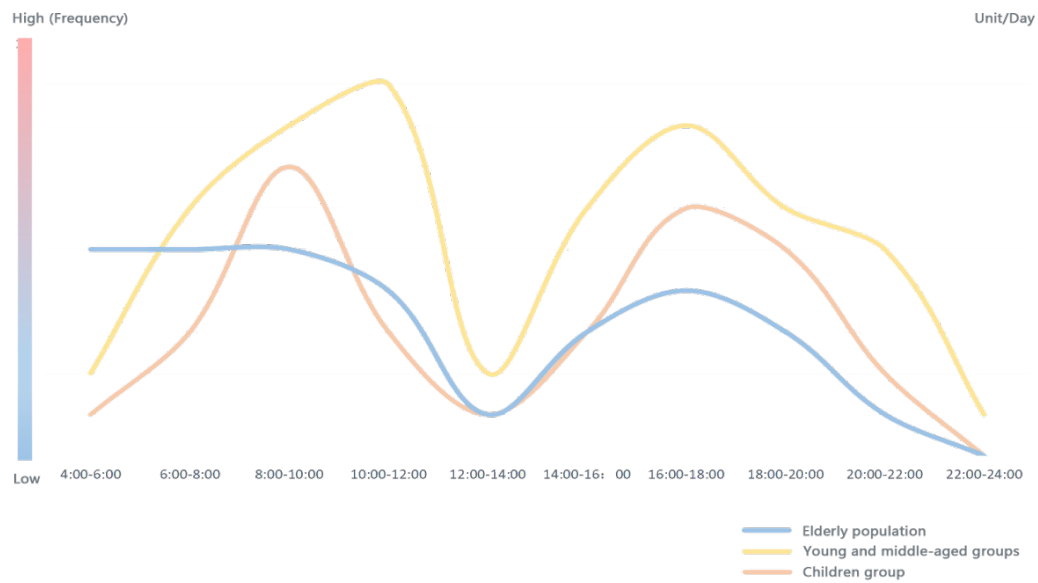


Figure 5: Frequency analysis of group behavior

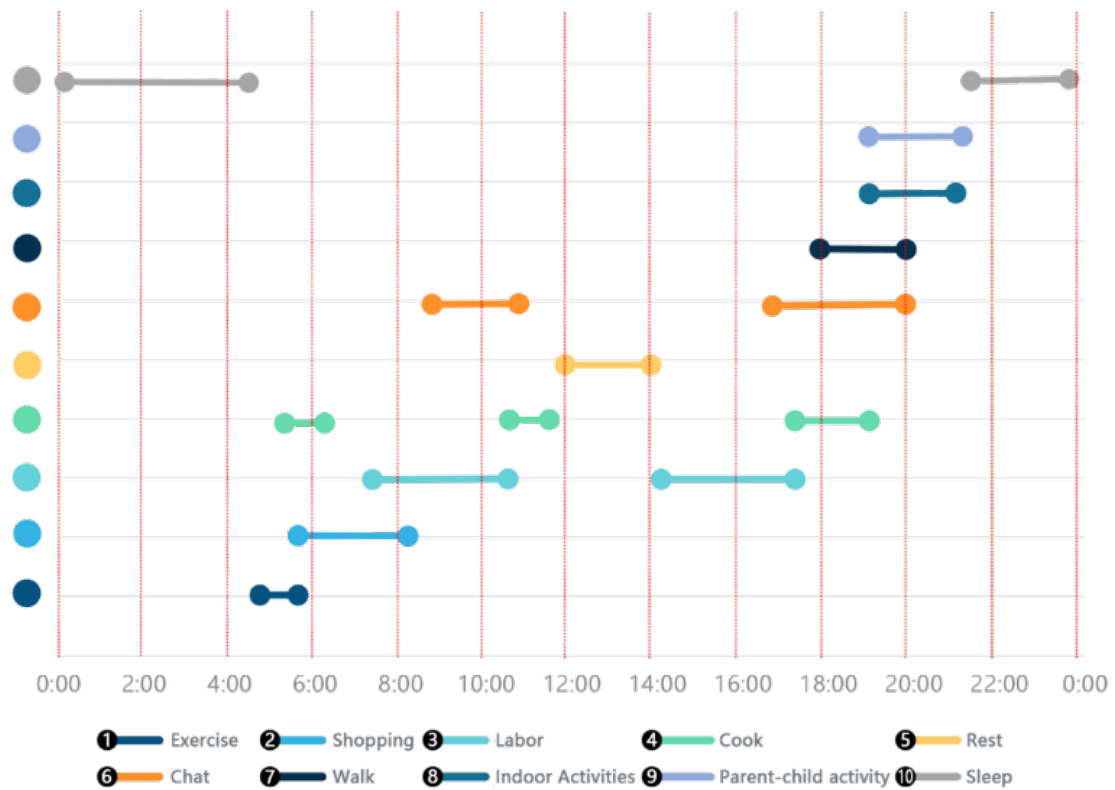


Figure 6: Analysis of Interval Group Behavior Types

### 3.2. Analysis of frequency and type of group activity

The frequency of audience activities in time is one of the important references for early investigation and analysis of environmental design. In-depth investigation of traditional villages in Xia'an village, Liuwang town, Qingdao, setting up positioning points in multiple areas where people gather, and observing the positioning time to obtain the data related to the types and frequencies of three groups of activities in one day: young and middle-aged, children and the elderly. The acquisition of relevant data can fully grasp the functional demands and current problems of users in villages, and provide research basis and support for later design work. (See Figure 5 and 6 for specific data analysis).



Table 1: Record of group behavior trajectory and summary of influencing factors

TIME INTERVAL	ACTIVITY FREQUENCY	DYNAMIC TREND	ACTIVITY TYPE	INFLUENCING FACTORS
4:00-6:00	Elderly Population > Young And Middle-aged Groups > Children Group	The frequency of the elderly population is balanced; Children and young and middle-aged groups are on the rise	Go to the market, do morning exercises and work	Purchasing needs of fresh vegetables and food; Job requirements
6:00-8:00	Elderly Population > Children Group > Young And Middle-aged Groups	The frequency of the elderly population is balanced; The frequency of children and young and middle-aged people is on the rise	Go to the market, do morning exercises, cook, farm and work	Purchasing needs of fresh vegetables and food; Dietary needs, farming and work needs
8:00-10:00	Elderly Population、Young and middle-aged groups and children groups are basically convergent	All groups show a dynamic development trend of balanced growth	Youth groups: farming and work Elderly people: chatting and hanging out	Farming and work needs; Demand for outdoor activities
10:00-12:00	Young and middle-aged group is slightly higher than the old group	The population showed a downward trend	Farming, working, cooking and eating	Farming and work needs; Dietary needs; Demand for outdoor activities
12:00-14:00	Young And Middle-aged Groups > Children Group > Elderly Population	All groups show trough points	Lunch break	Rest demand
14:00-16:00	Children Group、Young And Middle-aged Groups > Elderly Population	All groups showed an upward trend, and the dynamic development of young and middle-aged groups and children groups was higher than that of the elderly groups	Youth groups: farming and work Elderly people: chatting and hanging out	Farming and work needs; Demand for outdoor activities
16:00-18:00	Young And Middle-aged Groups > Children Group > Elderly Population	The population showed high points and peaks	Farming, working, cooking and eating	Farming and operation needs; Dietary requirements
18:00-20:00	Young And Middle-aged Groups > Children Group > Elderly Population	The population showed a downward trend	Walking, rest, indoor activities, parent-child activities	Rest needs, entertainment needs and communication needs
20:00-22:00	Young And Middle-aged Groups > Children Group > Elderly Population	The population showed a downward trend	Sleeping, indoor activities, parent-child activities	Rest needs, work needs
22:00-24:00	Young And Middle-aged Groups > Children Group and Elderly Population	The group activities of the elderly and children tend to zero, while the young and middle-aged groups show a downward trend	Youth groups: indoor activities, work Children and the elderly: sleeping	Rest demand, lightweight work demand

Through on-the-spot investigation, statistics and analysis are made on the activity content and activity frequency of each group in different intervals during the whole period, which can be seen in Table 1. According to the data analysis in Table 1, it can be seen that in the whole period of time, the activity frequency of young and middle-aged groups is generally higher than that of middle-aged and children

groups, and they go out for a long time, and the longest working time in a day can reach about 14 hours.

At the same time, according to the activity frequency in the morning, middle and evening, it can be seen that the current situation problems that should be paid attention to in the surrounding environment strategy of the village are as follows:












(1) In the morning, the activity frequency of the elderly group in the morning is higher than that of the other two groups; Because it is located in mountainous areas with low temperature and low visibility in the early morning, the sight, sight distance and visual accessibility of the surrounding environment are low. Present situation in villages, such as environmental lighting, guide system and other public facilities infrastructure is not perfect, lack of humanized design, and there are certain potential safety hazards.

(2) Noon: The rest demand caused by activities, all three groups are in the low stage of activity frequency, and the comfortable experience of surrounding environment, low decibel acoustic environment and environmental safety become the basic environmental demands in this period. However, the village has not considered this demand content at this stage, and all three aspects are insufficient and lacking.

(3) Evening: Three types of group activities are concentrated, which are basically divided into indoor and outdoor activities. The choice of activities is affected by season, temperature and weather. Outdoor activities are more suitable for temperature, and indoor activities are the main choice due to severe weather and climate such as severe cold and rainfall. The setting of public activity space should be considered in indoor and outdoor environment. At present, the indoor and outdoor spaces and facilities in villages are relatively simple in functionality, and the environmental comfort and experience are not good.

To sum up, In the whole-time activities of the village, Different groups have problems and deficiencies in physiological and psychological demands, use functions and comfort of experience in indoor and outdoor spaces of villages. Through comprehensive investigation and analysis, using qualitative and quantitative research methods, the relevant investigation conclusions and data can be obtained, which can provide theoretical basis and guidance for the practice of village environmental planning and design and public facilities design.

Table 2: Statistical analysis table of research demands and problems in traditional villages

	TYPIC	APPEAL AND QUESTION	PROPORTION
1	spatial function	Single space function and strong closure, while the lack of complex public space	80% 
2	architectural style	Private decoration leads to different architectural styles, so the overall style of the village lacks unity	30% 
3	road facilities	The road infrastructure in the village is weak and single in form, lacking barrier-free access	60% 
4	aesthetic zoning	Low Vegetation Coverage and Unreasonable Landscape Dynamic Planning in Villages	50% 
5	leisure facilities	There are no supporting leisure facilities in public areas and lack of leisure facilities	65% 
6	safety device	There is no guardrail beside the steep section of the village and the river, which lacks safety considerations	40% 
7	lighting installation	The small number of lighting facilities in villages leads to insufficient environmental illumination	55% 
8	guide system	The incomplete guide system in villages leads to fuzzy information identification	45% 
9	regional culture	The embodiment of regional culture is not clear enough and lacks systematic protection and inheritance	20% 
10	Venue vitality	The village lacks contact with the surrounding areas, which leads to the low comprehensive vitality of the site	45% 
11	overall development	The location is far away from the main road and the site is mainly mountainous terrain, so it is difficult to develop	40% 

### **3.3. User evaluation**

In the process of investigation in Xia'an Village, random exchange interviews were conducted with local villagers based on comprehensive investigation and analysis, and the daily living conditions of villagers were deeply understood. Summarize the problems and deficiencies of inheriting villages at this stage. Through relevant research work, the main problems existing in villages can be divided into the following aspects: single spatial functionality, vague regional cultural characteristics, outdated and incomplete environmental facilities, insufficient site vitality, blindness in comprehensive development and so on. The demands and problems of traditional village research can be seen in Table 2.

## **4. Comprehensive recommendations for post-use evaluation**

### **4.1. Macro-level**

Considering that the future development and cultural inheritance of traditional villages are mainly young and middle-aged groups in villages, Thinking: How to attract more youth groups to stay in the village through the revitalization and development of traditional villages, on the one hand, to ensure the integrity of the traditional family composition model, to meet the companionship demands of the elderly and children, to avoid the occurrence of social status quo such as lonely elderly and left-behind children, and to realize a healthy family living environment of "children are accompanied and the elderly have a sense of security"; On the other hand, as the main force in the development, inheritance and protection of traditional villages at present and in the future, youth groups shoulder the mission of inheriting and protecting traditional village culture. Returning home can promote the virtuous circle of village development, drive the economic development of villages and realize the revitalization of traditional villages.

### **4.2. Micro-level**

#### **(1) Integrated design strategy and optimization integration of site**

In the development of traditional villages, spatial complexity and sustainability have gradually become the new demand of public space. To a certain extent, it breaks through the traditional concept of single functional block in space, and changes the functional block from single and fixed to compound and changeable. Eliminate boundary consciousness and maximize the utilization of space effective resources [4]. The open public area planning in Xia'an Village has become a part of the functional structure of each family's living space. As an external expansion of the living space function, it can meet the functional space needs of entertainment and conversation in a wide range of activities. Fuzzy spatial boundaries, realize the openness of environmental space and scene experience, and enhance the effective utilization and association of internal and external space resources.

#### **(2) Inheritance and Protection of "Differential" Regional Culture**

Coordinate regional culture, rationally explore and protect local cultural characteristics and intangible heritage. For example, the intangible culture and traditional memory inherited by villages, village allusions and myths and legends, etc. Use Internet big data, 3D image scanning technology and other means to collect digital information, and build a digital platform for cultural digital protection. Under the new situation, the digital protection of intangible cultural heritage should seek a longer-term development trend with more diverse forms and ways. Use advanced scientific and technological means to permanently preserve regional culture, better inherit and carry forward it [5]. The "differential" way of regional culture excavation and protection is a new attempt, which publicizes and promotes the excellent cases selected from all categories of regional culture protection and inheritance, and learns from each other's strengths and complements each other's advantages. For example, Xia'an Village is located in a mountainous area, with superior geographical environment and climatic conditions, and its tea quality is high. Tracing back to history, there are records of planting tea trees and related allusions since ancient times [6]. Tea culture records can be systematically combed and integrated, digitalized by means of modern digital technology, and protected storage and cultural promotion based on online platform.

#### **(3) Reconsideration on "Continuous Perfection and Growth" of Environment**

At present, the village environment renewal design meets its functional, comfortable, experience, ecological and other related needs. With the renewal of surrounding environment and the increase of diversified functional needs of audience groups, the renewal of village environment is not fixed at a

certain stage, but a dynamic development process. We need to examine the design and development of village environment renewal from a sustainable perspective, and the sustainable development of village environment needs internal and external components. Including internal closed-loop growth-the preservation of daily living habits, folk customs and folk customs; External "open-loop" integration-village external exchange and input of new content, keep pace with the times, keep the vitality of the site and promote the comprehensive development of the village. The environmental renewal design of Xia'an Village respects and preserves the original style and living habits of the village to the utmost extent, By coordinating and planning the regional environment of villages, optimizing the environmental facilities system, exploring and integrating into the new model of "community" of village public environment [7], we can further enhance the spatial vitality, strengthen the relevance with the surrounding village environment, complement each other's advantages, continuously inject new vitality, and realize the sustainable self-improvement and growth of village environment.

## 5. Conclusions

As a traditional settlement-style living environment space form, traditional village is the precious wealth left by Chinese traditional farming civilization. Village is a space environment where human beings gather to live and live. Under the new environmental background and functional requirements, the demands of village environment in terms of function, convenience, comfort, ecology and beauty put forward new thinking modes and explorations on the composition mode and organization system of the original space. Based on the theory of post-use evaluation (POE), this paper takes the village environmental design of Xia'an Village in Qingdao as an example, from the perspective of users, and comprehensively analyzes the problems and shortcomings of the village environmental space at present with qualitative and quantitative research directions, so as to understand the users' activity space and environmental demands. From macro and micro perspectives, this paper puts forward design strategies for existing problems in villages, optimizes the overall functional regional organization of villages, improves the flexibility and utilization rate of space, further improves the public facilities system, and provides users with more comfortable and excellent environmental space. At the same time, this method is applied to the design research stage, and the related research contents and data can provide important theoretical basis and design guidance for the smooth development of later design practice.

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(3) Constructing a New Mode of "Curriculum Ideological and Political Education" for Professional Courses--Taking Exhibition Design Course as an Example (Grant No. hhxy. jg2233)

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