

General Education Course Design and Practice for Cultivating Cross-Disciplinary Innovative Transfer Ability——Exploration of Teaching Reform in *Appreciation of Chinese and Foreign Classic Architecture*

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Abstract: How to overcome the problem of “insufficient comprehension” in general education courses and promote cross-disciplinary thinking and innovation ability is an important issue in the present educational reform of higher learning. Taking the construction of the general education elective course “Appreciation of Chinese and Foreign Classic Architecture” as an example, this paper elaborately explains its course philosophy and implementation process based on “cross-disciplinary innovative transfer ability”. The course constructs a three-level teaching system including “Basic cognition”, “In-depth inquiry” and “Innovative transfer”, develops a “Five-Dimensional Toolbox for Architecture Appreciation” and Professional Transfer Task Cards for nine colleges, and enhances students’ interdisciplinary creativity by means of “Architectural Thinking +” interdisciplinary training. The practice indicates that by substituting “disjointed architectural knowledge” with “transferable methods”, general education courses can significantly arouse students’ interest in interdisciplinary thinking, thus forming a learning and innovation ability mechanism.

Keywords: General education; Cross-disciplinary transfer; Innovative ability cultivation; Architectural appreciation

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1. Introduction

The *Notice on Comprehensively Implementing the Action of School Aesthetic Education Infiltration* issued by the Ministry of Education in 2024 requires that aesthetic education should be involved in students’ lives, improving their fundamental abilities like cultural knowledge, aesthetic appreciation, artistic expression and creative activities ^[1]. University aesthetic education is changing from an emphasis on knowledge and skill

teaching to a new stage that stresses students' aesthetic enjoyment, personality development, and cultural literacy.

Architectural art is a comprehensive means of expressing spatial concepts, aesthetic appreciation, historical understanding and engineering reasoning, and has the inherent capability of interdisciplinary transfer. As an elective course open to all students in the university, "Appreciation of Chinese and Foreign Classic Architecture" aims to change the traditional teaching method of "discussing architectural history and analyzing famous works," changing the emphasis from "teaching students to recognize architecture" to "training students to apply architectural thoughts to their own majors." With "interdisciplinary innovative transfer ability" as the main objective of training, by building analytical methods, designing transfer tasks, and organizing interdisciplinary problem-solving practices, the course investigates a reform approach.

2. Background and positioning of course construction

2.1. Policy basis and practical needs

General education is intended to extend beyond the limits of each discipline. Its purpose is to improve students' general knowledge, enhance their critical thinking ability and develop their humanistic spirit. The Ministry of Education's *Opinions on Effectively Strengthening Aesthetic Education in Higher Education Institutions in the New Era* suggest that universities should utilize their own disciplinary advantages and interdisciplinary features to establish an art curriculum system. This system should be based on aesthetic and humanistic literacy and should concentrate on cultivating innovative abilities, which can meet the actual requirements of students in aesthetic education ^[2]. This policy offers a definite and high-level basis for the Appreciation of Chinese and Foreign Classic Architecture course.

The special advantage of architectural appreciation is that, as an important carrier of human civilization, architecture integrates engineering technology, humanistic history, artistic beauty, spatial philosophy, and so on. It serves as a good starting point for general aesthetic education. This course is available for students from nine colleges in our university with various backgrounds including business, management, information science, foreign languages, art, medicine, education, engineering and Marxist studies. Therefore, two requirements should be met: the course should present aesthetic content that is easy to understand for all, but it should also include a learning method that promotes interdisciplinary creativity.

2.2. Positioning of course construction

Looking back at the early stage of offering this course, three main problems stood out:

At the cognitive level, non-major students did not have a systematic method to understand or analyze the spatial scale, structural logic or cultural meaning of architecture. The traditional lecture-based teaching could not help them overcome the cognitive difficulty in three-dimensional space.

At the engagement level, general architectural appreciation courses are generally based on much theory and have little practical exercise. This restricts the depth of knowledge that students can acquire and reduces their intrinsic motivation.

At the transfer stage, the course design has not yet succeeded in linking knowledge among different majors, although students come from various fields. Consequently, they usually know something but cannot establish connections.

These problems made us reconsider the function of architecture as both an educational tool and a means of technical improvement, as well as a platform for cross-disciplinary innovation. We found that a general education course should not only help students learn some new facts. It should also provide them with some applicable thinking methods and assist them in using these methods creatively in their own professions^[3]. Therefore, the course Appreciation of Chinese and Foreign Classic Architecture took “the ability of cross-disciplinary innovation transfer” as its main objective. Then, it dealt with three questions systematically: “Which methods can be transferred”, “How should the transfer training be organized”, and “How to evaluate the effectiveness of the transfer”.

3. Teaching system design

3.1. Three-stage progressive teaching structure

The course is organized in a sequential manner, including three levels: Basic Cognition, In-depth Inquiry, and Innovative Transfer. There are 32 classes, which are reasonably distributed between theory and practice (12 classes for theory and 20 classes for practice).

Weeks 1-5 (Basic Cognition stage): By using the course website and knowledge graph, students study the five-dimensional analysis framework and carry out classroom observation tasks. These activities assist them in forming basic views on architecture.

6-10 (In-depth Inquiry phase): Students use the five-dimensional framework to evaluate classic architectural examples by means of online 3D architectural viewing software and submit a report on appreciation of classic architecture.

Weeks 11-16 (Innovative Transfer stage): Students work in groups to design an “Architectural Thinking Plus” interdisciplinary innovative plan according to their major subjects. The purpose is to help them progress from “learning to perceive architecture” to “thinking like an architect” and ultimately to “apply their own professional knowledge to architecture.”

3.2. Five-dimensional toolbox for architectural appreciation

From the architecture skills, we have summarized a five-dimensional evaluation system suitable for general education: function and space, structure and form, material and construction, order and proportion, and symbolism and meaning. Each aspect includes an inspection list that provides students with a systematic guide, enabling them to progress from the first impression to a rational analysis. For instance, in the “function and space” aspect, the list requires students to find out the purposes, observe the flow of people, recognize different areas, and feel the size. Thus, the students will gradually gain knowledge about how a building functions. In the “symbolism and meaning” aspect, the students are taught to recognize and understand the cultural symbols, thus acquiring the collective memories and values hidden in architecture (**Figure 1**).

This five-dimensional toolbox not only exceeds the professional knowledge of architecture but also serves as a universal thinking language that can be used by students of different fields. They are not necessarily architects. By means of this language, they can ‘translate’ their own subject problems into architectural terms, thereby gaining new perspectives. An important point is that the toolbox is not only applied to the analysis of buildings, but also provides five independent thinking conversion interfaces for interdisciplinary transfer afterward. Each dimension’s analytical method corresponds to a set of options for changing their major.

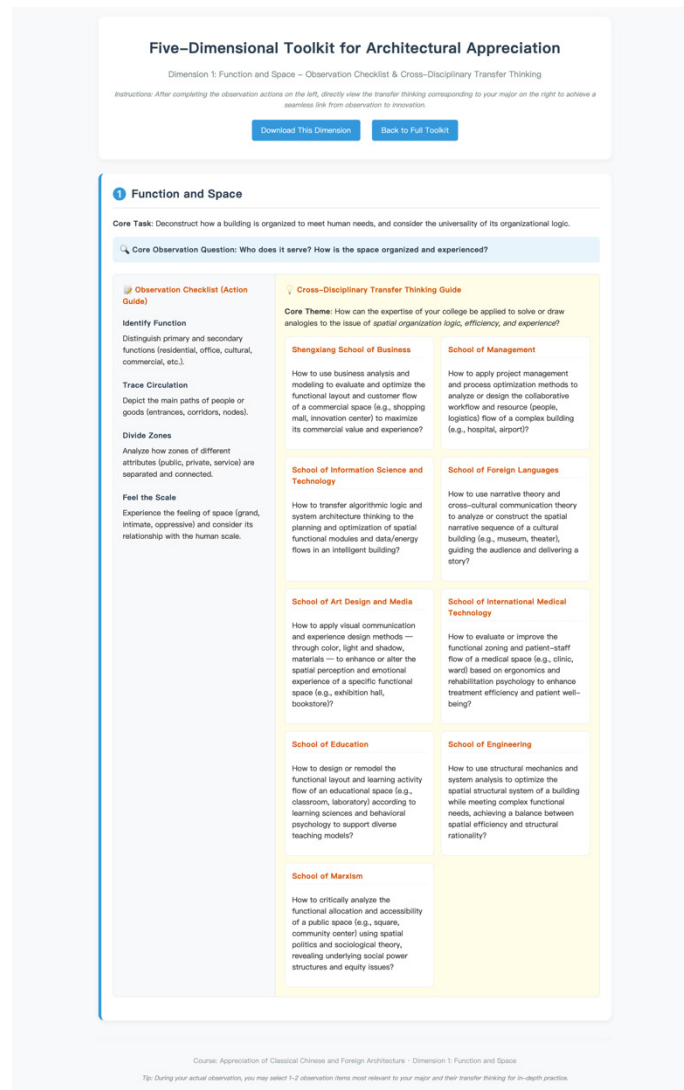


Figure 1. Five-dimensional toolbox— Function and space

3.3. Design logic of the “Professional Transfer Task Cards”

One of the hardest problems in cross-disciplinary teaching is to convert general concepts into practical techniques. To deal with this problem, the course has supplied special Professional Transfer Assignment Cards to the nine colleges where the students are studying. Each card contains four arranged modules.

- (1) Core task: Offers two optional directions for professional transfer proposals.
- (2) Related cases: Provides four architectural examples, each with a professional interpretation angle.
- (3) Case study and application suggestions: Enable students to apply the acquired appreciation methods to their own professional fields, concentrating on particular topics.
- (4) Outcome evaluation: Clearly defines what the proposal should look like and how it will be assessed.

For instance, students are required to make an “Architecture × Business Model” innovative plan for the development of community commercial areas or the renovation of old buildings, considering aspects such as profit model, capital operation, experience economy and asset value (**Figure 2**). Engineering students should also create “Architecture × Engineering Technology” plans based on near-zero energy houses or integrated

service centers, including structural systems, material technologies, construction procedures and green integration. Such scenario-based, graded designs can transform the architectural ideas from a method of “studying buildings” into a means of “creating,” thus accomplishing the desired change.

Professional Transfer Task Card for "Appreciation of Classical Chinese and Foreign Architecture"

Shengxiang School of Business

Your Core Task

Please choose one direction and complete an innovative proposal on 'Architecture × Business Model':

A. Hypothetical New Building: Propose a commercial operation and sustainable development plan for the 'Campus "Cross-boundary Symbiosis" Innovation and Entrepreneurship Center'.

B. Existing Building Optimization: Propose a 'Knowledge Retail+' micro-renovation and commercial vitality activation plan for the 'Old School Library'.

Relevant Cases and Professional Perspectives

The following cases showcase deep integration of architecture and commerce. Please analyze from investment, operation, or marketing perspectives:

1. Chunxi Ji Market, Jiading, Shanghai

Associated perspective: Scenario-based innovation of community commerce model

Explore how open and shared spatial design builds a community market that attracts stable customer flow.

2. Shenzhen Women & Children's Building Renovation

Associated perspective: Value reshaping of public services and asset operation under the PPP model

Analyze how public-private partnership balances social benefits and commercial returns.

3. AI PLAZA (West Bund Phoenix Nest), Shanghai

Associated perspective: Construction of consumption scenarios driven by technology experience

Study how digital technology integrates into commercial spaces to create differentiated experiences.

4. Columbia Park (Shanghai Columbia Circle)

Associated perspective: Asset appreciation and branded operation in historical district renewal

Examine how to transform a historic district into a high-value brand landmark.

Case Study & Application Guide

Based on the above cases, think from your professional perspective:

- **Profit Model:** How does the community market model of Chunxi Ji Market achieve sustainable profitability? What revenue model does your proposal have?
- **Investment & Operation:** How does the PPP model of Shenzhen Women & Children's Building inspire the financing and long-term operation of your proposal?
- **Experience Economy:** How does AI PLAZA use technology to enhance consumer experience? What experience-enhancing elements can your proposal introduce?
- **Asset Value:** How does Columbia Circle achieve asset appreciation? How does your proposal enhance the commercial and cultural value of the target building?

Deliverables & Evaluation

- **Format:** Submit a commercial innovation proposal (PPT/PDF, approximately 5-8 pages).
- **Content:** Must include market/problem analysis, core business model, operation strategy, preliminary financial feasibility analysis, and team division.
- **Core:** Must highlight the integration of architectural spatial characteristics and your major's business logic, explaining its commercial value.
- **Evaluation:** Proposals will undergo intra-group self-assessment and interdisciplinary peer review, focusing on innovation, commercial rationality, and logic.

Course: Appreciation of Classical Chinese and Foreign Architecture

Figure 2. Professional Transfer Task Cards for Business School

3.4. Intelligent teaching support construction

The course utilizes an online platform to establish a knowledge network including main Chinese and foreign architectural concepts. The resource includes image collections of typical architectural examples, web links to virtual tour sites of digital models, and supplementary materials from different fields. It provides digital aid for the students' self-study.

The knowledge graph divides architectural knowledge into several levels of nodes. While studying a

famous building, students can obtain information about its historical origin, cultural background, construction methods and artistic style at the same time, constructing a comprehensive mental network. This method is particularly beneficial for non-major students who have no systematic knowledge in architectural history. Architecture is no longer a “beginning from zero” chronological record; it turns into an open semantic network that students can enter from any part.

By observing digital models from different angles and using AI for style comparison, the students can eliminate the disadvantages of two-dimensional pictures and enhance their three-dimensional spatial knowledge. The AI tools are also beneficial for the investigation and verification procedures: firstly, the students carry out their own architectural analysis based on the five-dimensional system, then they check their results with those recognized by the AI. It enables them to discover some mistakes or common tendencies in their thoughts, thus forming an analysis and reflection cycle.

4. Dynamic evaluation system with “Three-Dimensional Competency Radar Chart”

4.1. Formative assessment design

The course evaluates students based on three main abilities: logical ability, aesthetic ability and innovative ability. The final mark is divided into three sections: routine work (15%), mid-term test (35%), and final exam (50%).

Regular performance is based on participation in classes and the practice of observation. It refers to the students’ active involvement and the quality of their systematic notes taken during the initial cognitive stage.

The mid-term examination requires students to write a report on classic architectural appreciation by applying the five-dimensional structure. Attention should be paid to logical reasoning, correct use of the framework and concise expression.

There are two parts in the final examination: a presentation of an innovative transfer achievement (40%) and a reflective report (10%). The presentation evaluates the “Architectural Thinking Plus” interdisciplinary proposal; the reflective report shows the changes in students’ thoughts throughout the course.

An important aspect in the arrangement of midterm and final examinations is the intended relationship between competencies. The results of the evaluation report - the training in analysis - are directly used in the problem diagnosis and technique transfer required for the final innovative proposal. Therefore, the three examination stages are not sole evaluations; they constitute a three-level ladder for competency development.

4.2. Visualized feedback mechanism of the competency radar chart

The course presents a “Three-Dimensional Competency Radar Chart” for dynamic assessment. During the learning process, students evaluate themselves in three directions: architectural appreciation ability, critical thinking and interdisciplinary innovation. It illustrates their progress from the beginning stage to the innovative transfer stage in a graphical manner.

This evaluation mechanism serves three purposes:

- (1) The self-assessment process requires students to systematically examine their learning results at every stage, thereby improving metacognitive monitoring.
- (2) Obtaining a visible improvement in their ability through visual curves enables students to have a clear sense of advancement, enhancing their learning self-efficacy.

- (3) It provides instructors with useful data for enhancing the course. When the growth curve of a competency dimension is not sufficiently smooth, it usually indicates that there is scope for modification in the teaching pace or techniques.

The three-stage progressive teaching procedure and the dynamic radar-chart evaluation support each other in forming a closed-loop system for the continuous enhancement of both teaching and learning.

5. Practical effects and construction reflections

From the practical experience of the course, the students have made notable progress in the ability to perform cross-disciplinary innovative transfer. By analyzing the innovative proposals submitted by the students, it is clear that the degree of transfer becomes deeper as the course advances: in the middle part of the course, the student proposals mainly stay at the stage of “analogical association”, merely replacing the architectural terms with professional terms; at the end of the course, most groups can accomplish “methodological reconstruction”. Students from various academic fields display a high interest in the teaching method of “understanding architecture through one’s own major” - transforming the appreciation of architecture from “listening to the teacher explain” to “finding the shadows of one’s own major within architecture”, which effectively improves the sense of achievement in the general education. The whole procedure from the conception of the cross-disciplinary project to the presentation of the proposal also gives the students a comprehensive training in public speaking and teamwork. A lot of students mentioned in their reflective reports that the most benefit they gained from the course was not the architectural masterpieces they remembered, but “learning a new way of solving problems” - which is exactly the fundamental value of cultivating the cross-disciplinary transfer ability in the general education ^[4].

Course operation shows that the main advantage of the three-stage progressive teaching plan is the ability growth mechanism of “constructing transfer.” After learning the “observation-analysis-embodiment” approach of architectural space in the first two stages, the students in the third stage apply these methods consciously as means to generate new ideas in their own majors, such as business students learning to consider service arrangements by “optimizing circulation,” management students learning to re-examine organizational cooperation by “using modular logic,” and information science students learning to design intelligent management systems by “applying BIM digital twins,” and so forth. From “studying architecture” to “using architecture to solve problems in their own specialty,” the course accomplishes an overall educational value improvement from the distribution of knowledge to the construction of cognition.

6. Conclusion

In the present situation of widespread promotion of aesthetic education in universities and the educational changes promoted by artificial intelligence, the course “Appreciation of Chinese and Foreign Classic Architecture” aims to find a systematic way to restructure general aesthetic education. Based on a three-stage teaching process including “basic cognition”, “in-depth inquiry” and “innovative transfer” as the framework, using “Five-Dimensional Tool for Architectural Appreciation” as the analysis method, “Professional Transfer Task Cards” as the conversion medium, knowledge graph and AI tools as technical assistance, and “Three-Dimensional Competence Radar Chart” as the evaluation feedback channel, the course tries to integrate the cultivation of aesthetic literacy and interdisciplinary innovative ability organically, serving as a reference

model for the intelligent reform of general aesthetic education courses in universities. In the future, the course construction will concentrate on three aspects: firstly, to speed up the full coverage of digital models and knowledge graphs to improve the convenience and depth of resources; secondly, to deepen interdisciplinary cooperative guidance by inviting more teachers from different majors to take part in the design and review of interdisciplinary innovative proposals; thirdly, to include outstanding student innovative results into the case library with regular updates, forming an ecological cycle where teaching resources change from “pre-set by teacher” to “produced by students”.

Disclosure statement

The author declares no conflict of interest.

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