Analysis of the Cultivation of Creativity and Expression Ability in Modular Teaching of Architecture Courses under the New Engineering Discipline: A Case Study of "Space Design and Expression"

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Abstract: The "Space Design and Expression" course plays a key role in cultivating creativity and expression abilities, significantly enhancing students' skills in these areas. These experiences provide valuable insights for the reform and development of other architecture courses. Additionally, this paper explores the importance of creativity and expression abilities in the field of architecture, proposing corresponding cultivation strategies using the "Space Design and Expression" course as an example. By adopting innovative teaching strategies and guiding practical projects, students can flexibly apply theoretical knowledge in real design scenarios, effectively enhancing their creativity and expression abilities and showcasing their design results in various ways. The paper also emphasizes the importance of cross-disciplinary collaboration and communication in enriching students' design concepts and expression skills. Finally, the paper envisions the future development of architecture courses, highlighting key trends such as technological integration and innovation, interdisciplinary integration and cooperation, globalization perspectives and international exchange capabilities, as well as continuous learning and self-improvement. These forward-thinking considerations provide useful references for the innovation and development of architectural education.

1. Overview of Cultivating Creativity and Expression Ability in Architecture Courses

1.1. Importance of Creativity and Expression Ability in Architecture

In architecture, creativity and expression ability are interdependent and jointly embody the charm and essence of architectural design. Innovation in architectural design is one of the core competencies in the field of architecture. As a discipline that combines art and technology, architecture not only requires students to have a solid foundation of knowledge but also to stimulate their unique creativity and advanced expression skills. In the context of artificial intelligence, creativity undoubtedly becomes the most valuable and competitive point. The primary focus of teaching is on whether students can unleash their boundless imagination and creativity. Expression ability is crucial in transforming creativity into reality. In architecture courses, cultivating students' creativity and

expression ability is essential. It not only affects their individual career development but also the future of the entire architecture industry. Through a series of teaching activities and practical projects, teachers can guide students to discover their creative potential, learn to express their design ideas professionally, and continuously improve their creativity and expression skills.[1]

1.2. Current Status and Deficiencies in Cultivating Creativity and Expression Ability

In the field of architectural education, although many schools have introduced related courses, the actual training outcomes have not met expectations.

1.2.1. Limited Teaching Content

Currently, many modular architecture courses are still confined to traditional architectural theory and technical skills, lacking in-depth exploration and practical application of modular design concepts. This makes it difficult for students to apply modular thinking in innovative design when facing real-world problems.

1.2.2. Traditional Teaching Methods

In terms of teaching methods, many institutions still follow traditional unidirectional teaching modes, lacking opportunities for interaction and practical operations. This traditional approach not only fails to inspire students' enthusiasm for learning and innovative thinking but also cannot effectively cultivate their practical skills.

1.2.3. Limitations in Practical Sessions

Modular architecture education should emphasize the importance of practical sessions. However, in reality, due to limited resources or insufficient awareness, many schools often neglect or restrict practical sessions. This makes it difficult for students to truly master and apply modular design methods and techniques.

1.2.4. Insufficient Stimulation of Creativity

Creativity is a core aspect of modular architecture, but during the teaching process, teachers often focus more on imparting technical knowledge and less on stimulating and cultivating students' creativity. This results in students' work often lacking novelty and uniqueness.

1.2.5. Lack of Expression Skills

In modular architecture, expression ability is equally important. However, many students struggle to convey their ideas accurately and aesthetically due to a lack of effective expression techniques and methods. This impacts the quality of their assignments to some extent.[2]

1.2.6. Student Differentiation

There is significant variation among students, and teachers lack appropriate teaching methods to balance instructional approaches. Consequently, the unique characteristics and strengths of each student are not effectively showcased, which hampers the improvement of creativity and expression skills.

1.2.7. Single Evaluation System

Currently, many schools still use traditional exam-based evaluation methods for modular architecture courses. This single evaluation approach cannot fully reflect students' creativity, expression skills, and practical abilities, nor does it encourage students' learning enthusiasm and innovative spirit.

Strategies for Cultivating Creativity and Expression Ability in Modular Teaching of Architecture Courses under the New Engineering Discipline: A Case Study of "Space Design and Expression"

2. Reform of Creativity and Expression Courses in Architecture

Under the new engineering discipline, the creativity and expression courses in the architecture major are undergoing profound reforms. These reforms focus on practical course work, aiming to develop students' hands-on abilities and innovative thinking, thereby producing a large number of highly skilled talents with practical skills for society. Looking ahead, professional training will be regarded as the core pillar and inevitable trend of architecture courses. Taking "Space Design and Expression" as an example, the reform of creativity and expression courses is starting from the teaching environment and carriers, building a diversified, three-dimensional, and integrated teaching scenario. This teaching scenario not only effectively stimulates students' interest and potential but also enhances their practical application abilities, cultivating more architecture talents with innovative thinking and practical skills.[3]

2.1. Course Overview

"Space Design and Expression" is a core course for the architecture major at Haikou College of Economics, totaling 40 hours. The course is divided into three modules corresponding to three learning scenarios: Creative Thinking (4 hours), Spatial Creative Design Conception (12 hours), and Practical Expression in Spatial Design (24 hours). This course focuses on tightly integrating creative conception, expression, and practice into a coherent teaching process, aiming to achieve the fusion of design and technological innovation. Additionally, the course emphasizes constructing a modular teaching model for architecture that aligns with the new engineering concept by deeply exploring and guiding the intrinsic motivation behind innovative behavior. This approach aims to develop students' comprehensive abilities and innovative thinking.[4]

2.2. Teaching Objectives

The goal of the "Space Design and Expression" course is to enable students to master the methods and techniques of spatial creative design through practical activities, thereby acquiring a complete set of professional knowledge and skills in spatial creative design. The course also emphasizes cultivating students' spirit of rigor, diligence, excellence, and innovation through various artistic, design, and technological practices. This teaching approach aims to help students establish a correct view of knowledge and technology, cultivate good professional ethics and a strong sense of social responsibility, and become highly professional and socially responsible architectural talents.

2.3. Teaching Methods

2.3.1. Teaching Methods for the Creative Thinking Module

Reverse Association Thinking
This method involves associating seemingly unrelated things through imaginative connections,

linking them in terms of imagery and connotation, and ultimately presenting them as specific design elements. This greatly enhances students' imagination and associative abilities, fostering creative thinking.

Cross-Association Thinking

Cross-association thinking combines different categories of objects, properties, shapes, textures, and functions in a cross-associative manner. This thinking mode breaks the sequential and conventional thinking patterns of daily life, offering high flexibility, fluency, and originality.

Memory Thinking

Through practical exercises, expanding innovative thinking, and feedback sessions, this method strengthens students' memory points and fosters their innovative thinking ability through divergent memory cultivation.

2.3.2. Teaching Methods for the Spatial Creative Design Conception Module

Various forms of creative inspiration activities, such as brainstorming, design competitions, and creative workshops, are organized to stimulate students' innovative thinking and imagination. Students are also guided to focus on social issues and humanistic concerns, fostering a sense of humanistic care and social responsibility in spatial design. This module emphasizes experimental topics like variable spaces and tangible and intangible elements to cultivate novelty, diversity, and criticality in spatial creative design. Using different materials and production techniques, students create design models or prototypes, fostering a pragmatic approach to creative thinking.

Examples of training topics include:

Application of irregular shapes

Reconfiguration of single elements

Isomorphism of contradictory elements

Plasticity of shapes

Creation and application of negative shapes

Association of single elements

Association of abstract concepts

2.3.3. Teaching Methods for the Practical Expression in Spatial Design Module

Design Tools and Techniques

Students are taught to master modern design tools and techniques such as AutoCAD, SketchUp, Revit, 3D printing, and laser cutting. Through practical operations, students can transform creative ideas into concrete design plans and products.

Spatial Perception and Analysis

Students are guided on how to perceive and analyze space, including keen observation and deep understanding of spatial form, color, material, and lighting elements. Field research and case studies enhance their comprehensive perception of the spatial environment, providing strong support for creative design. Students learn to visually present design problems using logical deduction processes and strengthen their in-depth research on users, needs, pain points, and scenarios during problem analysis.[5]

By reforming the course, combining technical expression with thinking training, the previously single-dimensional technical training is expanded into a multi-dimensional, multi-angle, and multi-level thinking training model. This teaching mode helps students develop comprehensive thinking and analytical skills while mastering design techniques.

2.4. Teaching Methods

The teaching methods for the "Space Design and Expression" course can be diverse, aiming to stimulate students' innovative thinking and enhance their expression abilities.

2.4.1. Case Analysis

Analyzing excellent domestic and international space design cases helps students deeply understand the design conception process, implementation techniques, and effect evaluation. Students are also guided to critically think about these cases, improving their independent analysis and problem-solving skills. Analyzing classic design cases helps students understand the components and expression methods of excellent design, thereby cultivating their aesthetic and critical thinking abilities.

2.4.2. Practical Operation

Students convert theoretical knowledge into practical design works through hands-on practice, which can include hand drawing, computer-aided design, or 3D modeling.

2.4.3. Group Discussion and Team Projects

Group discussions are indispensable in teaching, aiding students in deeply understanding course content while enhancing communication skills. Discussion topics should be academically valuable and interesting to students, aligning with course goals and industry trends. In team projects, various activities like seminars and team-building are organized to promote student interaction and collaboration. Effective cooperation techniques like role allocation and task division can improve team efficiency.

2.4.4. Project-Based Learning

Organizing students to engage in real-world design projects applies their learned knowledge to practical space design projects. Project practice assesses students' design and innovation abilities. Displaying results builds confidence and expression skills. Evaluation and feedback help students summarize experiences, laying a solid foundation for future design work. Assigning actual design projects for practical learning and application of design principles and expression techniques enhances problem-solving skills in real scenarios.

2.4.5. Feedback and Evaluation

Regular evaluations and feedback on students' design works help them understand their progress and areas for improvement. Feedback can be verbal guidance, written comments, or peer reviews. For instance, to understand students' satisfaction with practical teaching, regular surveys are conducted. Most students express satisfaction, noting significant improvement in professional and practical skills. Addressing issues and feedback promptly improves teaching quality.

2.4.6. Interdisciplinary Integration

Integrating architecture core courses with knowledge from computer science, environmental science, engineering, and other related disciplines constructs a comprehensive curriculum system. Encouraging interdisciplinary electives broadens students' knowledge horizons. Regular interdisciplinary course design competitions stimulate innovation and teamwork. Combining teaching resources with related fields like art, engineering, and sociology offers diverse learning perspectives

and problem-solving methods. These teaching methods can be combined to form a comprehensive teaching plan, selected and adjusted according to course objectives and student needs.

2.5. Teaching Mode

Diversified Practical Teaching

The core of this course is to cultivate students' unique personalities and practical skills. It encourages students to position themselves as the main subject of artistic design, actively showcasing the diverse charm of design from multiple levels, directions, and angles. In this teaching mode, students not only learn basic techniques but also how to deeply understand and grasp the intrinsic structure and spiritual essence of design objects.

By implementing diversified teaching, we emphasize teaching students according to their abilities and being flexible. Based on students' different personalities and interests, we consciously guide them, avoiding a single teaching mode. Our goal is not to impose the teacher's personal style on students but to stimulate their creativity and imagination, encouraging them to explore various artistic expression methods, achieving freedom and diversity in design expression.

3. Conclusion and Outlook

3.1. Conclusion

In the field of architecture, educators continuously explore and innovate in cultivating creativity and expression abilities in the next generation of architects. They understand that traditional teaching methods alone are insufficient to meet contemporary challenges and that new teaching methods and strategies must be sought. Consequently, advanced teaching concepts like design thinking and creative thinking have been introduced into the classroom, becoming essential tools for stimulating students' creativity. These teaching methods encourage students to think outside the box and view problems from new perspectives, leading to more original and groundbreaking design ideas.

To translate theory into practice and turn creativity into concrete designs, practical projects are essential. In practice, students apply theoretical knowledge to real design scenarios, engaging in trial and error, adjustments, and refinements until they achieve satisfactory design solutions. This process not only hones students' practical skills but also teaches them how to maximize creativity within real-world constraints.

Showcasing design results is also a critical aspect of developing expression abilities. Through various forms such as drawings, models, and animations, students present their design concepts to the outside world. This not only serves as a comprehensive test of their design skills but also provides an excellent opportunity for communication and exchange with others. In this process, students learn to adjust their presentation styles to different audiences, ensuring accurate information transmission and broad recognition of their designs.

It is worth mentioning that interdisciplinary cooperation and communication play an indispensable role in cultivating students' creativity and expression abilities. Architecture is a highly integrative discipline closely related to many other fields. Through exchanges and cooperation with other disciplines, students are exposed to more diverse design concepts and methods, broadening their design horizons and thinking boundaries. Such interdisciplinary collisions and integrations often spark unexpected creative ideas, injecting new vitality and inspiration into design.

Creativity and expression abilities are the two core pillars of architecture. They are interdependent and mutually reinforcing, jointly supporting the majestic edifice of architecture. On our future journey, let us work together to cultivate these two critical abilities in students, laying a solid foundation for the bright future of architecture.

3.2. Outlook

As we delve into the future development of architecture courses, it becomes clear that technological innovation and advancement are increasingly becoming the core driving forces shaping the future of the field. With the rapid development of digital technologies and virtual reality, architecture education is facing unprecedented opportunities. The deep integration of these technologies will not only significantly broaden students' design perspectives, allowing them to explore a wider range of design fields, but also greatly enrich their design expression techniques, enabling their creativity to be showcased in more vivid and tangible ways.

In this context, interdisciplinary cooperation and integration are particularly important. Traditional disciplinary boundaries are gradually being broken down, and architecture is undergoing deep integration and interaction with many other fields. This interdisciplinary learning and practice will provide students with a more diverse knowledge system. More importantly, it will inspire students' cross-disciplinary creativity, allowing them to draw inspiration from the convergence of diverse knowledge, bringing new perspectives and thoughts to the field of architectural design. Such interdisciplinary exchange and collaboration will undoubtedly greatly enhance the innovation level of architectural design, injecting more vitality and dynamism into the field of architecture.

Looking to the future, architecture courses are entering a new era full of limitless possibilities, accompanied by numerous opportunities and challenges. The deep integration and innovation of technology, interdisciplinary cooperation and exchange, a global perspective and communication, and continuous self-improvement and learning will become the core forces driving the advancement of architecture courses. Therefore, we must continuously strengthen the cultivation of students' creativity and expression abilities, providing them with a richer and more diverse learning environment and practical platform. Only in this way can we nurture more outstanding architects with innovative spirit and practical skills, injecting more vitality into the continuous development of architecture.

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