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TEACHING REFORM IN LANDSCAPE ARCHITECTURE MAJOR FROM THE PERSPECTIVE OF PROJECT-BASED STUDIO APPLICATIONS

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Abstract: This article focuses on the teaching reform practice and reflections in the Landscape Architecture major at Guangdong Technology College. It utilizes the industry-academia-research ternary system as the framework for teaching reform in the Landscape Architecture major, with the Qingmiao Plan Workshop serving as the platform, and design competitions as the entry point. By analyzing and considering the role and significance of design competitions in teaching, the article explores how to seize this opportunity to deepen the disciplinary teaching model in teaching practice and cultivate students' comprehensive abilities such as social observation and reflection, and problem-solving. Meanwhile, it further discusses how design competitions can promote students' application of learned knowledge in practice and trigger deeper reflections and practical explorations of teaching reform, aiming to provide new ideas and practical guidance for future educational explorations in this field.
Keywords: Teaching reform practice; Design competitions; Industry-academia-research; Landscape architecture

1 INTRODUCTION

The teaching reform in the Landscape Architecture major is a highly focused research topic in the current field of higher education. Studio project-based learning, as an exploratory pathway for educational reform, offers the possibility of integrating theoretical study, practical application, and innovative capacity, aiming to cultivate interdisciplinary talents who better meet social demands and possess innovative abilities. However, within this emerging educational philosophy, the educational reform of the Landscape Architecture major is still in its initial stage, particularly facing certain bottlenecks in the professional education model. Traditional teaching methods are increasingly difficult to adapt to the current needs for cultivating students in the Landscape Architecture major, lacking in stimulating students' innovative thinking and practical application. The Landscape Architecture major is confronted with unprecedented challenges in addressing the demands of the new era and nurturing talents with practical application abilities. Meanwhile, as a discipline that intersects multiple fields including the harmonious coexistence of humans and nature, society, and humanities, the Landscape Architecture major requires continuous innovation in its education system to satisfy the needs of modern society. Against this backdrop, the educational reform of the Landscape Architecture major needs to shift from traditional knowledge presentation to cultivating students' innovative and practical application abilities. Design competitions, as an effective medium for activating students' thinking and nurturing their innovative abilities, how can they guide students to step out of traditional thinking frameworks and stimulate their abilities to think independently and solve problems? These questions will permeate this study, which aims to provide more innovative thinking logic for the education of the Landscape Architecture major through theoretical analysis and empirical research.

2 LITERATURE REVIEW

In the field of educational reform for the Landscape Architecture discipline, due to the constraints of the discipline's characteristics, teaching methods that emphasize theoretical instruction, such as "Flipped Classroom" and "Case-Based Teaching," possess certain limitations. Daniel T. Willingham and Richard E. Mayer, among others, uniformly hold the view that these two teaching methods, by overly emphasizing students' self-directed learning and problem-solving abilities, neglect the issue of cognitive load during the learning process and lack authentic application scenarios, which is detrimental to the cultivation of students' innovative abilities and may not be applicable to all disciplines and all students. For this reason, the studio project-based model, as an alternative teaching method, has garnered considerable attention. It integrates into professional teaching reform through the process of establishing studio platforms, introducing projects, and fostering collaborative participation..

In the 1970s, German physicist Haken introduced the concept of "Synergetics," which he defined as the fusion and interaction among major factors in a large system that transcends individual entities. Early researchers such as David W. Johnson and Roger T. Johnson proposed a theoretical framework for collaborative learning. Their work on cooperative learning and social learning theories played a crucial role in the development of collaborative learning. Early scholars studying synergetics emphasized the importance of cooperation, interaction, and co-construction of knowledge. The concept of "Open Innovation" was first proposed by American management scholar Henry Chesbrough in 2003, in his

book Open Innovation: *The New Imperative for Creating and Profiting from Technology*. This concept emphasized external collaboration and shared innovation, laying the foundation for the later development of collaborative innovation theory. Subsequently, Peter Gloor introduced the term "Collaborative Innovation," highlighting the need for network interaction among subjects, the exchange of ideas, technologies, and information, ultimately leading to the achievement of goals. Studio project-based learning is theoretically grounded in providing industry collaboration or simulated practice, emphasizing the requirements of "collaboration" and "collaborative innovation" to prompt students to apply theoretical knowledge in real-world settings, enhance their practical abilities, and improve their problem-solving skills, thereby fostering the integration and enhancement of innovative capabilities. Donald A. Schön characterized design studios as places for "learning by doing" and "thinking in action" . Kay Brocato believed that design knowledge is formed through the participation, interaction, and co-construction of teachers and students [1]. This cooperative relationship between teachers and students, as well as among students, enables the generation of design knowledge.

Therefore, the workshop model has garnered significant attention as an alternative teaching method. Wang Qianna and others reconstructed the basic ideas and methods of landscape architecture courses by integrating the workshop model [2]. Li Ruidong and his colleagues guided students to use public policy knowledge and Mapping techniques to create community spaces and analyze real social issues through the form of workshops [3]. Neil Kirkwood founded the Ulsan Regeneration Workshop, where teachers from both inside and outside the university jointly guided students in a 14-week renewal and transformation project targeting Ulsan city and its hinterland 4]. However, in the context of landscape architecture, as an engineering discipline that intersects with multiple fields such as engineering, architecture, planning, and management, the role of collaboration and cooperation is particularly emphasized [5, 6]. Workshops focused solely on this discipline fail to achieve the goals of professional integration, collaborative education, and collaborative innovation [7]. Therefore, actively advocating and establishing interdisciplinary partnerships can help create more diverse cooperative opportunities in research, teaching, and practice, bringing numerous benefits to discipline development.

Currently, numerous universities have exhibited diversification and innovation in exploring models and pathways for industry-university-research (IUR) collaboration and multi-university joint cooperation. Universities have actively established partnerships with enterprises, local authorities, and social organizations, conducting a series of activities such as short-term joint design teaching workshops and practical base construction in combination with actual projects. These efforts have jointly carried out scientific research projects, provided students with opportunities for practice and professional guidance, and achieved a series of outcomes in promoting the transformation of scientific and technological achievements, technology transfer, and talent cultivation, thereby exploring deeply integrated IUR models. For example, South China University of Technology has collaborated with the DaST Foundation, Guangzhou Academy of Fine Arts, and foreign institutions to conduct multiple short-term joint design teaching workshops in Jiuxian Village, Guangxi. This project fully utilized local resources for teaching transformation, achieving a joint interaction between design teaching, local education, and rural community building [8]. Tongji University held the "Mapping Joint Workshop" at Chuangzhi Farm, serving a learning and living community through interdisciplinary lectures and plant drift activities [9]. Nanjing Forestry University proposed the "1+2+3" practical teaching model, focusing on the construction of IUR training bases to provide students with a combination of multiple types of off-campus enterprise practice platforms [10]. Additionally, Xuzhou Engineering College adopted the Workshop design studio practical teaching model, integrating teaching methods and practical activities into daily learning [11]. The Gardening major at Gansu Agricultural University has adhered to centering on Lanzhou in the construction of off-campus practice bases, signing cooperation agreements with multiple gardening enterprises and institutions, promoting the development of scientific research projects and student participation [12]. The School of Art and Design at Guangdong University of Technology established a studio in Qingtian Village, exploring the "Qingtian Paradigm" and providing a development path for rural revitalization [13]. The Health Landscape Workshop created by South China Agricultural University and SPI conducted a practice from the perspectives of professional education, industry hotspots, and talent cultivation, resulting in the transformation of materials such as the "Health Community Work Guidelines." During the same period, Guangzhou Academy of Fine Arts also actively co-hosted the Dongguan Water Town Design Workshop based on the TOD concept with SPI, bringing actual projects into professional education to explore the development of water town cities and industry hotspot orientations.

Based on the aforementioned literature, universities have explored reforms in landscape architecture education centered around industry-university-research (IUR) collaboration, yet there are still the following deficiencies: (1) Although these activities emphasize practical teaching and deep integration of IUR, in practical operation, there is a disconnect between teaching content and practical needs. There is an overemphasis on practical operation, which goes beyond simply imparting practical skills and neglects systematic learning and mastery of theoretical knowledge. Furthermore, there is room for enhancement in cultivating students' innovative thinking and social insight abilities; (2) Some activities may lack systematicness and sustainability. Although one-off workshops or practical projects are conducted, the lack of long-term planning and continuous follow-up fails to form an effective learning loop and a long-term mechanism for deep IUR collaboration. Based on the deficiencies identified in the existing literature, this paper studies the practical application of multi-party IUR collaboration and workshop-based practical teaching in the education process of landscape architecture majors, and its possible contributions are as follows: (1) On the basis of maintaining IUR partnerships, a studio project-based model is constructed, combining the characteristics of design competitions to further strengthen and cultivate students' innovative thinking and social insight abilities; (2) A teaching reform in

landscape architecture majors is implemented through the construction of an IUR evaluation and guidance system, exploring effective learning and evaluation mechanisms, as well as a virtuous cycle model for achievement transformation and talent delivery, which serves as a practical test to enrich teaching and learning forms.

3 PRACTICE OF TEACHING REFORM IN LANDSCAPE ARCHITECTURE MAJORS UNDER THE INDUSTRY-UNIVERSITY-RESEARCH TERNARY SYSTEM

3.1 Case Selection

This paper selects the teaching reform of the landscape architecture major at Guangdong Technology College as a case study, with specific reasons outlined below. Firstly, Guangdong Technology College, established in 2005, is a relatively young private undergraduate institution of applied learning located in Zhaoqing. Its landscape architecture major began autonomous recruitment in 2016, and the first batch of students graduated smoothly in 2020, entering various design institutes, gardening research institutes, and architectural research institutes. With a current student population exceeding 800, the urgency of addressing the specific situation of student cultivation and the transition to social talents is particularly pressing. Secondly, landscape architecture was downgraded from a first-level discipline to a second-level discipline within engineering in 2023. This paper focuses on exploring challenges faced by the teaching application of the landscape architecture major at our institution in utilizing industry-university-research collaboration to achieve effective learning and evaluation, cultivate students' innovative thinking and social insight abilities, and efficiently promote achievement transformation and talent delivery.

3.2 Implementation Framework of Teaching Reform Practice

In the practice of teaching reform for the landscape architecture major under the industry-university-research ternary system, the implementation framework can be divided into three main steps. Firstly, establish a mechanism for deep integration of industry, university, and research, collaboratively explore talent training programs, and sign cooperation agreements with enterprises to form deep cooperation with industry enterprises. Secondly, on the basis of maintaining the industry-university-research cooperation relationship, establish an innovative talent platform called the "Green Seed Program" with the goal of talent cultivation. This platform introduces enterprise projects to establish a studio-based project model and incorporates industry-university cooperation mentors. Collaborate with enterprises to determine project implementation processes, design lectures, and other content, balancing the authenticity of research topics and the relevance of teaching, ensuring that teaching content is closely aligned with industry needs and enhancing students' practical abilities. Finally, conduct an evaluation of the effectiveness of the landscape architecture teaching reform. Based on the results of the reform and evaluation, propose improvement suggestions and strategies to effectively promote the teaching reform of the landscape architecture major and achieve the goal of integrated industry-university-research development (Figure 1).

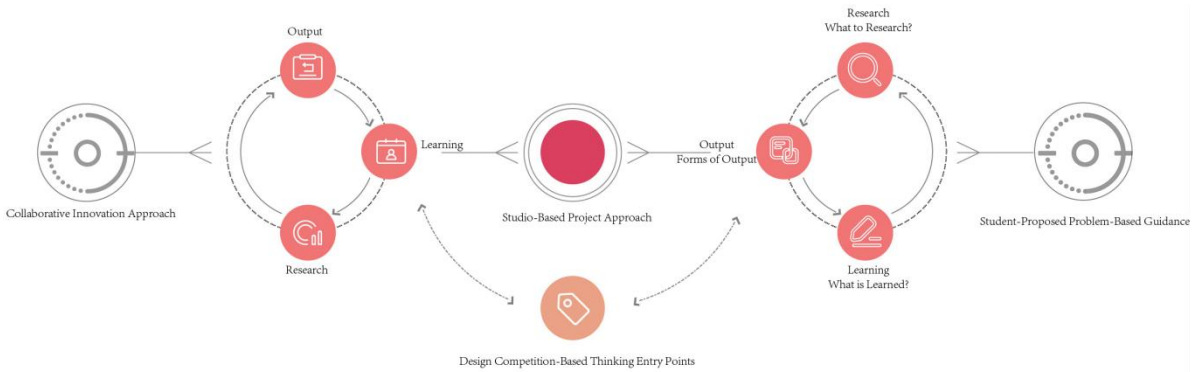

Figure 1 Implementation Framework

3.3 Implementation Process of Teaching Reform Practices

3.3.1 Establishment of a Deeply Integrated Industry-Academia-Research Mechanism

In the early stages of landscape architecture teaching reform practices under the industry-academia-research ternary system, institutions actively sought to expand job opportunities and signed cooperation agreements with 12 enterprises. They entered these enterprises in the form of teaching management teams from research offices for exchanges, focusing on education and research cooperation in the field of landscape architecture, including the formulation of talent training programs, joint research projects, talent cultivation in institutions, and talent transfer to enterprises. Gradually, a deeply integrated industry-academia-research mechanism was established.

3.3.2 Construction of the Qingmiao Plan Innovative Talent Platform + Introduction of Two Elements

During the construction of the Qingmiao Plan innovative talent platform, emphasis was placed on the implementation of the "double introduction" strategy, which involves introducing corporate projects to establish a studio-based project mode to stimulate students' innovative thinking, team collaboration, and problem-solving abilities. Additionally, corporate mentors were introduced to provide industry-leading insights and practical guidance, thereby cultivating students' innovative abilities and professional qualities in a comprehensive and multi-layered manner.

3.3.3 Teaching Content Balancing Authenticity of Projects and Relevance to Teaching

When designing teaching content, consideration was given to balancing the authenticity of projects and their relevance to teaching. Project topics were evaluated by the teaching team to ensure that they aligned with both practical issues and teaching requirements. During the topic formulation process, the teaching experience and professional knowledge of responsible teachers served as fundamental guarantees for formulating practical project tasks. The selected topics were ensured to be close to real life or industry practice, capable of stimulating students' interest in learning and reflecting the applied value of knowledge, while also being closely linked to teaching objectives, curriculum settings, and students' learning needs. This effectively imparted core concepts, principles, and methods, helping students build a systematic knowledge system. By integrating real-life cases with theoretical teaching, students' comprehensive abilities and innovative thinking in facing practical problems were cultivated, providing them with a practical and challenging learning environment.

4 EVALUATION OF THE EFFECTS OF STUDIO-BASED PROJECT-ORIENTED TEACHING REFORM

3.1 Correlation Analysis

Based on the sustainability of studio-based project-oriented teaching reform, this section analyzes the correlation between 16 indicators: clarity of objectives, degree of goal attainment, innovative thinking, problem-solving abilities, practical experience, practicality of project outcomes, team collaboration, communication skills, project planning and organization, time management, disciplinary integration, breadth of application, project evaluation, project reflection, creative expression, and teacher feedback. The Pearson correlation coefficient is used to represent the strength of these correlations. A detailed analysis in Figure 2 reveals that, in terms of factors influencing the sustainability of studio-based project-oriented reform, four evaluation indicators—clarity of objectives (correlation coefficient of 0.676), project evaluation (correlation coefficient of 0.740), project reflection (correlation coefficient of 0.605), and teacher feedback (correlation coefficient of 0.652)—show significant positive correlations at the 0.01 level, indicating strong and significant positive relationships.

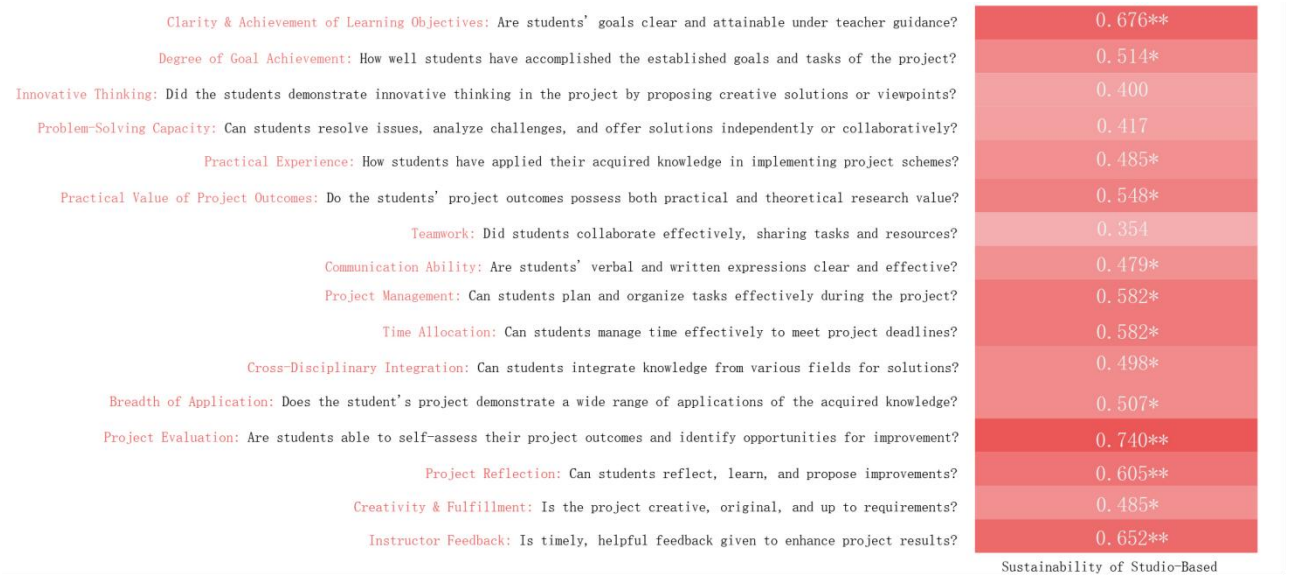

Figure 2 Correlation Analysis of Sustainability Based on Studio-Based Project-Oriented Teaching Reform

In the sustainability of landscape architecture teaching reform based on studio-based project-oriented learning, clarity of objectives is a core evaluation indicator that is highly focused on during the implementation of this teaching reform. Projects with clear objectives provide directional guidance and lay a solid foundation for subsequent projects by establishing clear work priorities and action directions. The clarity and specificity of goal setting and expected outcomes, as well as their understanding and acceptance by all participants, mean that each participant clearly knows their role and responsibilities within the project, as well as the value and contribution they should make to achieve the project goals. Locke and Latham [14] proposed the "Goal Setting Theory" in their book *A Theory of Goal Setting & Task Performance*, which suggests that specific and clear goals help stimulate individual motivation and form a unified direction. This is particularly important for addressing the current widespread issue of purposeless learning among students. Secondly, the process of project evaluation enables regular objective assessments and feedback on project

progress and outcomes, which helps identify problems in a timely manner and take corrective measures. This process also cultivates students' abilities to "observe problems" and "discover issues", thereby improving execution efficiency. At the same time, regular project reflection based on project evaluation results involves students in deep thinking and summarization of the experiences and lessons learned during the project implementation process. This reflection is not merely a simple review of what happened in the project, but a systematic analysis and consideration of the challenges faced, progress made, and problems encountered during the achievement of project goals. Through project reflection, students can identify the successful factors and causes of failure in the project, explore possible improvement measures, and learn from these experiences and lessons, providing valuable references and guidance for future project implementations. This continuous reflection and learning process helps continuously improve students' self-monitoring and self-regulation abilities.

Additionally, teacher feedback is an indispensable aspect throughout the entire process of studio-based project-oriented reform. Teachers provide feedback on their perspectives, opinions, and suggestions regarding the project implementation process. This feedback can include evaluations and feedback on project design, execution methods, resource support, and learning outcomes. However, in terms of the three stages of "goal setting," "project evaluation," and "project reflection," the intensity of teacher feedback varies. During the "goal setting" stage, teachers provide the most direct feedback on teaching practices for students, helping them better understand the purposes of professional teaching reform and the potential problems and difficulties they may face when participating in reform activities. By actively participating in the teacher feedback process, students can adjust and improve project design and execution strategies in a timely manner, thereby enhancing the sustainability and long-term development capabilities of the project. In the latter two stages, teachers' feedback is more about moderate guidance, and the degree of intervention should be controlled.

3.2 Analysis of Relationships Between Other Variables in the Correlation Coefficient Matrix

Based on the above discussions and analyses, we further explore the relationships between other indicator variables in the Pearson correlation matrix for landscape architecture teaching reform (Table 1). Strong correlations exist between creative thinking and creative expression (0.859) and between creative thinking and application breadth (0.793). The close relationship between creative thinking and creative expression indicates that individuals with higher creative thinking tend to perform better in actual creative expression. During this teaching reform process, students with higher creative thinking may be more inclined to apply their creativity to different fields and categories, conducting comprehensive project evaluations to optimize and improve project execution processes and outcomes. Meanwhile, the relationship between social observation and problem-solving can be further studied in relation to other indicators, where it shows only a low correlation with communication (0.316). This suggests that communication skills may not be the most direct influencing factor in the process of social observation and problem-solving, while other factors such as team collaboration (0.704), interdisciplinary integration (0.791), practical experience (0.819), creative expression (0.819), and project reflection (0.750) may be more significant. Issues in a studio project often require the observer to have extremely sensitive social insight to uncover, and landscape architecture is an interdisciplinary field that requires a multidimensional perspective on problems, providing valuable insights and solutions through team collaboration and reaching consensus. Additionally, practical experience provides the team with the skills and knowledge needed to solve problems, thereby enhancing their problem-solving capabilities. In view of this, both problem insight and problem-solving require a high level of interdisciplinary integration ability to reflect creativity in the proposed solutions and engage in reflection and contemplation at every stage of the project process, in order to gain lessons and further improve one's problem-solving abilities.

Table 1 Pearson Correlation Analysis of Sustainability in Studio-Based Project-Oriented Teaching Reform

Indicator	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Sustainability (1)	1																
Clarity & Achievement of Learning Objectives (2)	0.676**	1															
Degree of Goal Achievement (3)	0.514*	0.476*	1														
Innovative Thinking (4)	0.400	0.472*	0.607**	1													
Problem-Solving Capacity (5)	0.417	0.669**	0.449	0.630**	1												
Practical Experience (6)	0.485*	0.604**	0.354	0.652**	0.819**	1											
Practical Value of Project Outcomes (7)	0.548*	0.518*	0.666**	0.632**	0.692**	0.603**	1										
Teamwork (8)	0.354	0.467	0.416	0.513*	0.704**	0.527*	0.452	1									

Communication Ability (9)	0.479**	0.454	0.366	0.491**	0.316	0.517**	0.284	0.534**	1									
Project Management (10)	0.582**	0.567**	0.617**	0.510**	0.411	0.436	0.559**	0.602**	0.718**	1								
Time Allocation (11)	0.582**	0.324	0.617**	0.420	0.518**	0.546**	0.658**	0.708**	0.595**	0.714**	1							
Cross-Disciplinary Integration (12)	0.498**	0.607**	0.591**	0.606**	0.791**	0.608**	0.768**	0.641**	0.522**	0.614**	0.713**	1						
Breadth of Application (13)	0.507**	0.462	0.616**	0.793**	0.595**	0.647**	0.735**	0.694**	0.683**	0.803**	0.803**	0.764**	1					
Project Evaluation (14)	0.740**	0.618**	0.588**	0.686**	0.613**	0.693**	0.627**	0.405	0.548**	0.424	0.545**	0.696**	0.580**	1				
Project Reflection (15)	0.605**	0.618**	0.441	0.686**	0.750**	0.832**	0.502**	0.675**	0.548**	0.424	0.545**	0.569**	0.580**	0.846**	1			
Creativity & Fulfillment(16)	0.485**	0.604**	0.486**	0.859**	0.819**	0.750**	0.603**	0.771**	0.517**	0.546**	0.546**	0.722**	0.796**	0.693**	0.832**	1		
Instructor Feedback (17)	0.652**	0.536**	0.018	0.191	0.285	0.398	0.480**	0.323	0.328	0.369	0.369	0.325	0.426	0.414	0.414	0.398	1	

* $p<0.05$ ** $p<0.01$

The above content merely interprets the indicators with strong significance, but it should not overlook the special significance of low-correlation indicators in the process of this teaching reform. The correlation between teacher feedback and the other 16 indicator variables is generally low. Among them, the correlation coefficients between teacher feedback and the three variables of innovative thinking, creative expression, and social observation and problem-solving are 0.191, 0.398, and 0.285, respectively, which are close to zero and statistically insignificant. Although from a statistical perspective, there is almost no linear relationship or research significance between them, this is not the case in the context of this landscape architecture teaching reform. Teacher feedback in student studio projects is limited in terms of intervention, which suggests that landscape architecture teaching has begun to shift from the traditional "what content does the teacher think should be taught to students?" to the "what do students want to learn?" approach to teaching and learning. By establishing and guiding learning goals and tasks, students are provided with more space for active learning and thinking, rather than the teacher merely imparting knowledge in a superimposed manner (Figure 3). This is a practice that enriches the forms of teaching and learning.

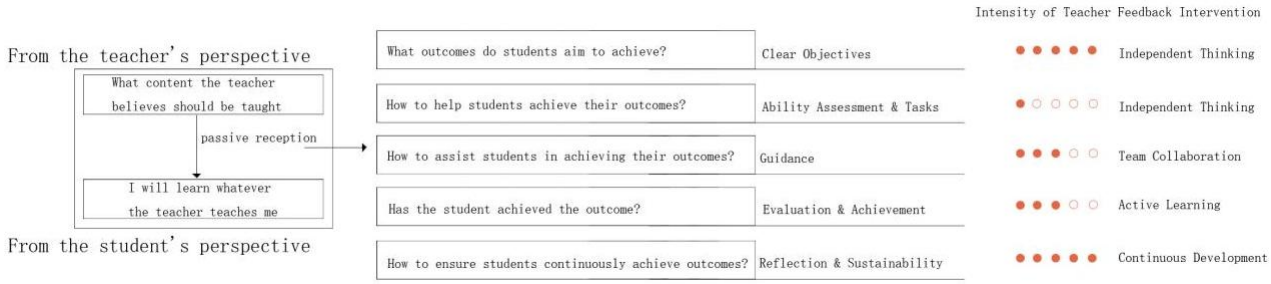

Figure 3 Transformation Model of Teaching Methods and Intensity of Teacher Feedback Intervention

Therefore, by deepening the understanding of the influencing factors and mechanisms among the indicator variables in the Pearson correlation matrix related to the teaching reform of landscape architecture, we can provide more effective guidance and support for the development of individuals and organizations.

5 EVALUATION OF TEACHING REFORM EFFECTIVENESS

4.1 Feedback Analysis of Participation Process

As illustrated in Figure 4, questionnaire data has revealed students' exceptional performance in projects related to innovative thinking and problem-solving abilities. Specifically, more than one-third of students (38.89%) strongly agree that they have proposed creative solutions or viewpoints in their projects, a proportion significantly higher than other options, indicating that students actively exercise innovative thinking and are willing to try new solutions in workshops. Additionally, over half (50%) of students believe they perform very well in solving problems independently or through collaboration, further demonstrating their outstanding problem-solving abilities and teamwork spirit when facing challenges.

However, questionnaire data has also highlighted some challenges in the areas of project planning and organization, time management, and interdisciplinary integration. Although some students perform well in these areas, many others

express difficulties. For example, in project planning and organization, while 38.89% of students rate their performance as excellent, a considerable proportion (61.11%) believe their project plans need improvement or they have deficiencies in organizing and managing project tasks. In time management, despite some students indicating they can arrange time reasonably (38.89%) and another 44.44% giving positive evaluations, some students may still impact project progress due to improper time management. In interdisciplinary integration, although 44.44% of students rate their performance as excellent, some students face challenges in integrating knowledge across different disciplines and providing interdisciplinary solutions, which may be related to their disciplinary backgrounds, knowledge accumulation, and opportunities for interdisciplinary exchanges.

In response to these challenges, future workshops should develop targeted improvement strategies. For example, in the area of project planning and organization, more project planning and management tools can be provided to assist students in crafting more detailed and feasible project plans. In terms of time management, instruction on time management skills should be enhanced to guide students in allocating their time appropriately, ensuring the timely completion of project milestones. As for interdisciplinary integration, activities such as interdisciplinary lectures and seminars can be organized to facilitate exchanges and collaboration among different disciplines, thereby enhancing students' interdisciplinary integration capabilities.

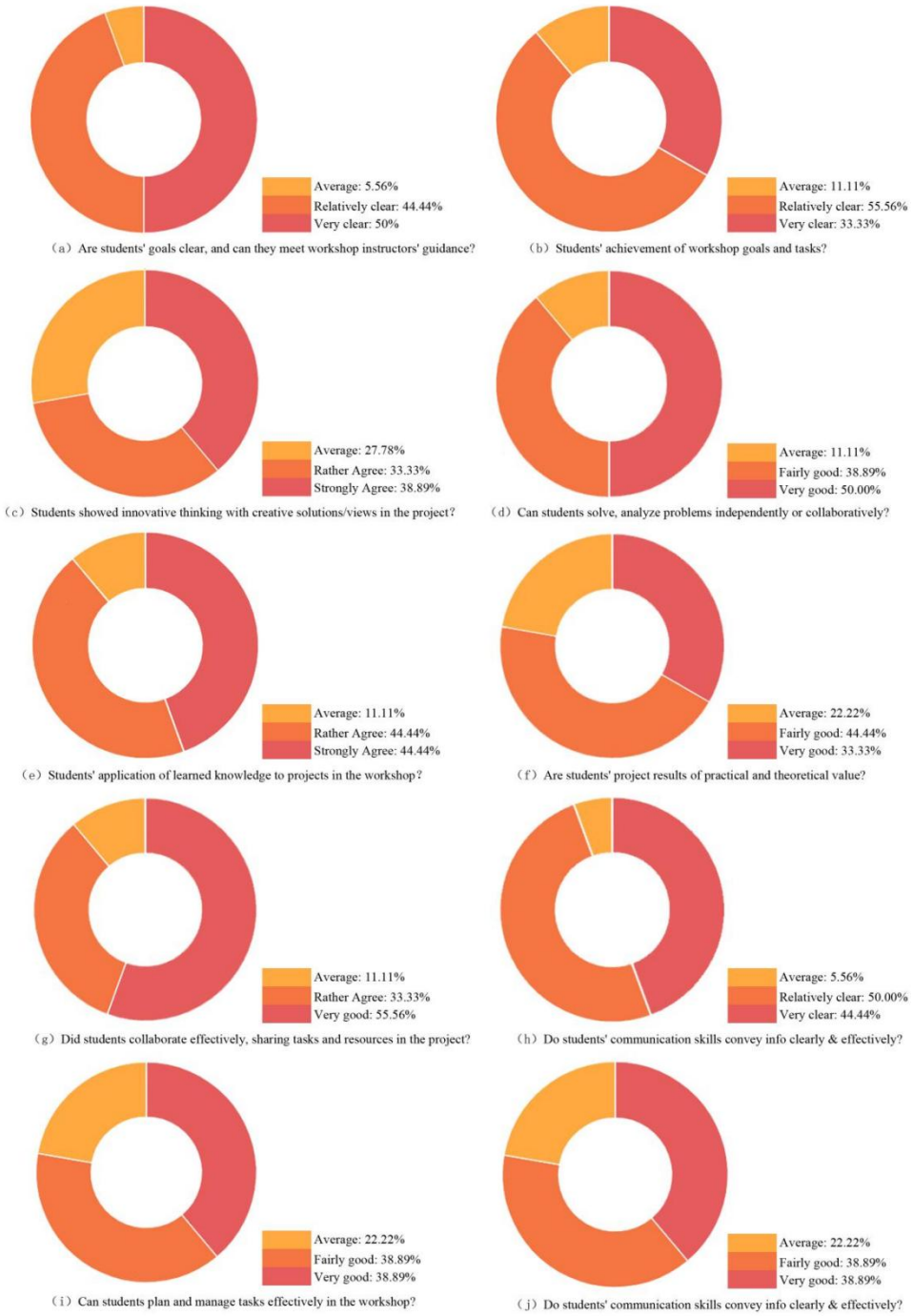

Figure 4 Analysis of Evaluation Results for the Teaching Reform Process

4.2 Demonstration of Teaching Reform Effectiveness

4.2.1 Dual Optimization of Teaching Quality and Learning Ecology

Firstly, the teaching reform has significantly enhanced students' comprehensive abilities. Through the studio project-based teaching model, students are placed in real project environments and tasked with actual design responsibilities. This not only exercises their practical abilities but also cultivates innovative thinking and problem-solving skills. In projects, students learn how to communicate with clients, coordinate team members, handle unexpected issues, and integrate knowledge and skills from different disciplines, thereby enhancing their interdisciplinary integration capabilities. The improvement of these comprehensive abilities lays a solid foundation for students' future careers. Secondly, the teaching reform has improved teaching quality and student satisfaction with learning. In the studio project-based teaching model, teachers can more intuitively understand students' learning situations and progress levels, providing them with more targeted guidance and assistance. Meanwhile, students can feel their growth and progress during the project participation process, thereby increasing their learning enthusiasm and satisfaction. This teaching model not only promotes interaction and communication between teachers and students but also enhances students' learning motivation and self-confidence.

4.2.2 Enhancement of Interdisciplinary Integration Capabilities

The studio project-based teaching model encourages students to exercise innovative thinking and propose novel design concepts and solutions. During project execution, students face various challenges and constraints, such as budget limitations and site restrictions. These challenges prompt students to constantly think, explore, and innovate, thereby enhancing their innovative thinking and problem-solving abilities. Meanwhile, the landscape architecture major involves multiple disciplinary fields, such as architecture, horticulture, ecology, etc. In the studio project-based teaching model, students need to collaborate with team members from different disciplinary backgrounds to jointly complete project tasks. This interdisciplinary collaboration mode prompts students to learn how to integrate knowledge and skills from different disciplines, thereby enhancing their interdisciplinary integration capabilities. In projects, students not only deepen their understanding of the landscape architecture major but also broaden their knowledge horizons.

4.2.3 Successful Transformation and Application of Studio Project-Based Teaching

The successful implementation of the studio project-based teaching model in the landscape architecture major is not only reflected in the improvement of students' practical skills and the optimization of teaching quality but also in its successful transformation of teaching projects into practical applications, while simultaneously promoting in-depth research by teachers and frequent outstanding performance in student design competitions. On the one hand, studio project-based teaching is closely integrated with industry demands, encouraging students to participate in the design and implementation of real projects. These projects not only provide students with valuable practical experience but also submit their design outcomes to design competitions (Figure 5). On the other hand, studio project-based teaching also promotes the in-depth development of teachers' research topics. By guiding students to participate in projects, teachers continuously accumulate practical experience and, combined with teaching needs, carry out a series of highly targeted and practical research topics. These research topics not only enrich teaching content, improve teaching quality, but also provide a research foundation for subsequent landscape architecture teaching reforms.

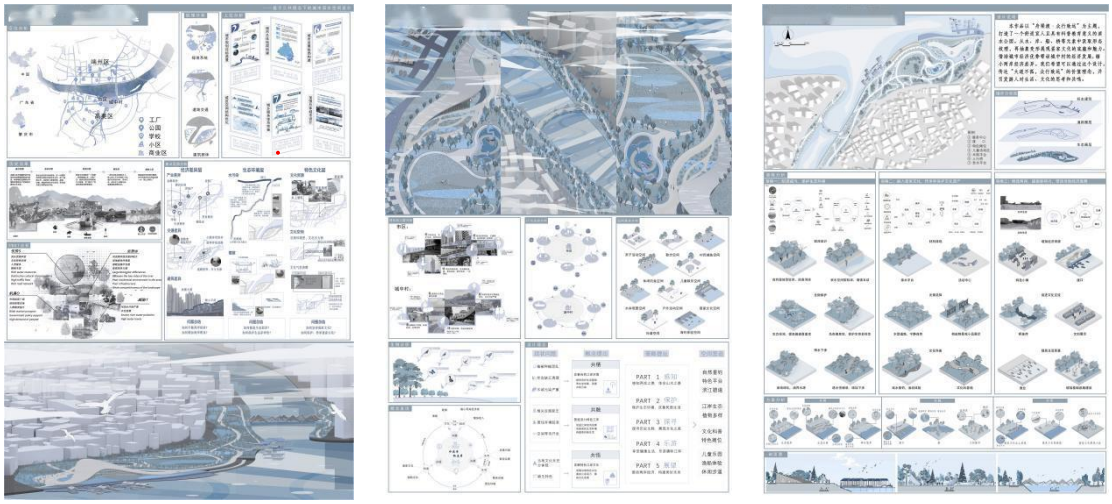

Figure 5 Exhibition of Student Achievements

6 SUMMARY AND DISCUSSION

This paper focuses on the research of teaching reform in the landscape architecture major from the perspective of studio-based project application. Taking the landscape architecture major at Guangdong Technology College as an example, it delves into the teaching reform practices within the industry-academia-research ternary system. By introducing enterprise projects and cooperative mentors from both the college and enterprises, a studio-based project model is established, which effectively enhances students' comprehensive abilities, optimizes teaching quality and learning ecology, and successfully achieves the transformation and application of teaching projects. Although the studio-based project teaching model has achieved certain promotional value and application prospects in the reform of the landscape architecture major, there are still areas for improvement, and targeted improvement strategies have been formulated. For example, in terms of project planning and organization, more project planning and management tools can be provided to assist students in developing more detailed and feasible project plans. In terms of time management, the teaching of time management skills can be intensified to guide students in making effective time arrangements and ensuring the completion of project milestones as scheduled. In terms of interdisciplinary integration, interdisciplinary lectures, seminars, and other activities can be organized to promote communication and cooperation among different disciplines and enhance students' interdisciplinary integration abilities. Furthermore, in the ongoing reform process, it is imperative to further deepen industry-academia-research cooperation, optimize teaching content and methods, and cultivate more landscape architecture professionals with innovative and practical abilities to meet the demands of modern society. Additionally, this study offers valuable references and insights for the teaching reform of other majors.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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