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Research on the Mechanism and Path of Civil Engineering Teachers Assisting School Infrastructure Construction

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Abstract: Civil engineering teachers possess theoretical foundation, engineering literacy, and industry vision, which are highly compatible with the needs of campus infrastructure in terms of quality, cost, functionality, and education. Their deep involvement in the entire process of campus infrastructure can effectively improve project quality, control costs, ensure safety, and simultaneously contribute to teaching, research, and practical education. On the basis of exploring the core value of civil engineering teachers in assisting campus infrastructure, this paper constructs a participation path from three dimensions: planning and design, technical control, and integration of industry and education. The pain points and countermeasures in the current participation mechanism are analyzed, aiming to explore a new model of campus infrastructure management that promotes "coexistence of construction and education, and win-win quality."

Keywords: Civil engineering teachers; Campus infrastructure; Engineering management; Integration of industry and education

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1. Introduction

The traditional management mode of campus infrastructure projects relies heavily on administrative departments and external units involved in construction. Currently, there have been many studies on the problems and strategies in the construction process of campus infrastructure projects. For example, exploration of the whole process tracking audit mechanism for campus infrastructure projects [1], research on project cost risks and control measures [2], problems in current planning and design management [3], working methods for campus infrastructure project design management [4], application of construction technology management in campus infrastructure construction [5], etc. However, civil engineering teachers have long been engaged in teaching and research in civil engineering, architectural design, engineering management, cost, water supply and drainage, HVAC, and other fields. They are familiar with regulatory standards, master

cutting-edge technologies, have on-site experience, and are rooted in the front line of university teaching. They understand the functional pain points and usage needs of spaces such as laboratories, training rooms, and teaching buildings, which are highly compatible with the needs of campus infrastructure in terms of quality, cost, functionality, and education. They are the natural professional support force for campus infrastructure. Therefore, promoting the deep participation of civil engineering teachers in the entire process of campus infrastructure construction is not only a need for improving engineering quality [6] but also an important path for building a "dual teacher" team [7,8] and project-based practical teaching [9,10]. How to activate this internal professional force and make it an endogenous driving force for campus infrastructure, rather than an external consultant, is a key proposition for improving the quality of campus infrastructure projects and implementing industry education integration.

2. The core value of civil engineering teachers in assisting campus infrastructure construction

(1) Strengthen the defense line of engineering safety and quality: Civil engineering teachers participate in drawing review, technical disclosure, material acceptance, concealed engineering acceptance, and sub-item acceptance from a professional perspective, and can promptly correct design defects, construction deviations, and other issues that do not comply with specifications. They can provide technical control in key areas such as structural safety, waterproofing engineering, seismic construction, and fire compliance, reduce quality hazards and safety risks, and achieve compliance, reliability, and durability in campus engineering. Compared to external supervision, on-campus teachers have a greater sense of responsibility and sustainability, which can effectively prevent jerry-built projects.

(2) Realize precise cost and sunshine infrastructure: Teachers in the field of engineering management and cost management have the ability to manage the entire life cycle of cost, and can participate in various stages such as feasibility study estimation, design estimation, bidding control price review, change visa management, and completion settlement audit. They can use professional data and market information to strictly control change visas, redundant designs, and unreasonable expenditures, effectively identify unreasonable high prices and invalid expenditures, achieve precise cost and transparent infrastructure construction, and improve the efficiency of fund utilization.

(3) Strengthen the integration of functional adaptation and educational scenarios: Traditional infrastructure design is often led by design institutes, which can lead to situations where the drawings look good but are inconvenient to use. Civil engineering teachers directly participate in teaching management and have the best understanding of the real needs of teaching experiments, practical training, teacher-student use, as well as the pain points of humanized design in student dormitories and canteens. They can propose optimization suggestions from the perspective of educational space in the design stage, such as spatial layout, streamline organization, facility adaptation, energy conservation and environmental protection, to promote the transformation of infrastructure from building houses to building scenarios and educating new people, making teaching buildings, training buildings, dormitories, venues, etc. more in line with the needs of education and nurturing.

(4) Feed back teaching and practical education, deepen the integration of industry and education: The campus infrastructure project itself is a natural large-scale training base. Teachers lead students to participate in on-site measurement, BIM modeling, quality inspection, data organization, and other

work, making campus construction sites a real-life classroom. Teachers use real projects to carry out case teaching, on-site teaching, and production internships, achieving the goal of "where engineering works, where teaching follows," and transforming abstract classroom theories into concrete engineering practices. This "learning by doing" model not only solves the pain points of difficult and costly internships in civil engineering majors, but also enhances students' sense of professional identity and belonging to their alma mater during the process of participating in the construction of the alma mater, achieving multiple benefits of "building a project and cultivating a group of talents."

3. The implementation path of civil engineering teachers assisting campus infrastructure construction

(1) Decision-making and planning design stage: During the project initiation and feasibility study phase, civil engineering teachers should be deeply involved in the functional requirement demonstration of the project. The school should establish a teacher expert group to participate in project feasibility study, site selection planning, functional requirement demonstration, and scheme comparison; Propose optimization suggestions from various aspects such as structural safety, efficiency, energy conservation and low-carbon, reasonable cost, and construction feasibility to avoid large-scale changes in the later stage.

(2) Design control and technical consulting stage: During the project design phase, civil engineering teachers participate in construction drawing review, design optimization, and special scheme demonstration, and conduct professional reviews on structures, water, electricity, HVAC, fire protection, energy conservation, etc. Provide technical support such as BIM modeling, collision detection, and process optimization to enhance the practicality of design implementation.

(3) Construction implementation stage: During the construction bidding and on-site management stages, teachers should play a role in technical supervision. Participate in construction management through technical consultants, on-site supervision, quality sampling, etc., supervise key processes, material entry, specimen inspection, civilized construction, and safety measures; Assist in handling technical difficulties, change negotiations, and on-site visas to ensure controllable progress and quality. Teachers should also participate in cost control throughout the entire process, preparing and reviewing the bill of quantities and controlling prices; Track changes and claims, provide settlement audit basis, cooperate with internal and external audits, and enhance the standardization and transparency of infrastructure funding.

(4) Completion acceptance and operation and maintenance stage: Engineering delivery is not the end point, teachers should participate in completion acceptance and post evaluation, including household acceptance and special acceptance. For special projects such as waterproofing engineering, energy-saving engineering, and indoor environment testing, professional instruments and standards are used for review, and rectification lists and quality assurance suggestions are proposed to ensure delivery quality. Assist in organizing complete engineering technical files, BIM completion models, and operation manuals, and provide technical training to the logistics management department to ensure efficient operation and maintenance of buildings throughout their entire lifecycle.

(5) Collaboration between teaching, research, and infrastructure construction: Build infrastructure projects as important teaching and practical bases for teachers and students, transform them into course cases,

graduation designs, practical training tasks, scientific research topics, and carry out research in green construction, intelligent construction, engineering management, and other directions, achieving the goal of "one project, one batch of achievements, one batch of talents."

4. The main problems of civil engineering teachers participating in campus infrastructure construction

(1) The mechanism is not sound and the channels for participation are not smooth. There is a lack of a normalized collaboration mechanism between infrastructure management and teaching departments, with teachers mostly participating on a temporary basis, unclear rights and responsibilities, and non-standard processes, making it difficult to deeply embed.

(2) Lack of time and energy guarantee. The teaching and research tasks of teachers are heavy, and there is a lack of workload recognition, incentives, and assessment support for their participation in infrastructure construction, which limits their sustainability and professionalism.

(3) Ambiguous role positioning. Some schools regard teachers as auxiliary labor and fail to play a core role in technical supervision, decision-making consultation, and quality supervision, resulting in insufficient professional value.

(4) Insufficient conversion of achievements. Infrastructure projects are disconnected from teaching and research, and real-life resources, engineering data, and technical experience have not been transformed into curriculum resources and research materials. The integration of industry and education is superficial.

5. Strategies for effectively promoting civil engineering teachers to assist campus infrastructure construction

(1) Establish a sound institutional system and clarify the boundaries of rights and responsibilities. At the school level, the "Measures for the Participation of Civil Engineering Teachers in Campus Infrastructure Management" should be introduced, and a support group for infrastructure majors should be established, led by school leaders and jointly participated in by the Infrastructure Department, Academic Affairs Department, secondary colleges, finance, and auditing. The qualification standards, job responsibilities, and rules of procedure for participating teachers should be clarified to achieve institutionalized and normalized participation. Establish an Infrastructure Expert Database and implement dynamic management to ensure the professionalism and independence of technical services.

(2) Improve incentive mechanisms and stimulate endogenous motivation. Include teachers' participation in infrastructure work in the performance appraisal and professional title evaluation system. Clarify the conversion standards for technical service workload, provide special research funding, research scoring, practical experience recognition, teaching achievement awards, or labor subsidies, and ensure teachers' time and energy investment. For teachers who have performed outstandingly in major infrastructure projects, they will be given preferential treatment in the evaluation process to stimulate their enthusiasm and sense of responsibility for participation.

(3) Highlight integrity and compliance, safeguard safety bottom line. When teachers participate in campus infrastructure involving material procurement and technical control, strict anti-corruption risk prevention and control mechanisms must be established. Implement full process traceability management, adhere to

a transparent process of "discussion without decision, decision without action," strictly prohibit teachers from designating suppliers or participating in technical evaluations of stakeholders, uphold the bottom line of integrity, and ensure transparency, compliance, and efficiency.

(4) Strengthen professional empowerment and enhance service capabilities. Schools should carry out infrastructure policies, school standards, project management, and clean discipline training to promote the transformation of teachers into composite talents who understand education, engineering, and management, and better adapt to the needs of campus infrastructure.

(5) Promote the integration of construction and education, and create a real-life education platform. Designate campus infrastructure projects as school-level practical teaching bases, establish a platform for integrating industry and education, and implement an integrated talent training model of "Project-Course-Internship." Transforming engineering data, construction processes, and technical challenges into course cases, graduation design projects, and scientific research projects, promoting the transformation of construction sites into classrooms, drawings into textbooks, and engineers into mentors, forming a virtuous cycle of "engineering promotes teaching, teaching feeds back engineering," and improving the overall scientific research and teaching level and talent cultivation quality of the school.

6. Conclusion

Civil engineering teachers, as the most knowledgeable, caring, and responsible technical advisors within universities, are an important professional force for the high-quality development of school infrastructure. Their deep involvement in campus infrastructure is the optimal solution to improve infrastructure quality, maximize financial benefits, reconstruct educational scenarios, integrate industry and education, and build a "dual teacher" team. Schools should make efforts in four aspects: mechanism, guarantee, integration, and compliance, and build a new model of promoting education through construction, assisting construction through education, and achieving a win-win situation between construction and education. Campus infrastructure should become both a hard support for educational conditions and a living classroom for talent cultivation, laying a solid material and educational foundation for the high-quality development of the education industry.

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References

[1] Wang Q, Du TT, 2025, Exploration of the Whole Process Tracking Audit Mechanism for University Infrastructure

Projects. Chinese Journal of Kaifeng University, 39(01): 45–50.

[2] Su R, 2025, Research on Engineering Cost Risks and Control Measures of Comprehensive Building Construction Projects - Taking A University as an Example. Chinese Journal of China Tendering, (04): 177–179.

[3] Guo F, 2026, Research on Several Issues of Design and Management of University Infrastructure Projects - Taking the New Student Dormitory Building Project of Hubei Institute of Fine Arts as an Example. Chinese Journal of Architectural Design Management, 43(02): 25–30.

[4] Zhou Z, 2025, Optimization Strategy for Planning, Design and Management of Infrastructure Construction in Guangxi Universities. Chinese Journal of China Building Metal Structure, 24(06): 166–168.

[5] Pan Y, 2016, Application of Civil Engineering Construction Technology Management in Teaching Building Construction. Chinese Journal of Science and Technology Outlook, 26(35): 152.

[6] Sun JH, 2012, Thoughts on the Participation of Construction Professional Teachers in School Infrastructure Construction Projects. Chinese Journal of Education and Career, (32): 89–90.

[7] Zhang RH, 2011, Promoting the Construction of a Dual Teacher Team Through Practical Teaching in Enterprises. Chinese Journal of China Vocational and Technical Education, (35): 71–74.

[8] Fu CQ, Li Q, Dong BQ, 2026, Cultivation of Modern Civil Engineers Rooted in National Infrastructure. Chinese Journal of Research on Higher Engineering Education. https://link.cnki.net/urlid/42.1026.G4.20260305.0941.002.

[9] Li YJ, Zhu CW, 2020, Design and Management of University Infrastructure in the Construction of Double First Class Universities: A Case Study of the New Student Cafeteria and Student Apartments Project at Beijing Forestry University. Chinese Journal of University Logistics Research, (06): 40–43.

[10] Yang L, Wang DF, 2020, New Exploration of University Infrastructure Project Construction in the Teaching Reform of Architecture Major. Chinese Journal of Building Materials and Decoration, (02): 134–135.