

# Discussion on the Value of BIM Competition in Civil Engineering Professional Education

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**Abstract:** Building Information Modeling (BIM), as an innovative technology, is gradually being widely used in the global construction industry. BIM is both a 3D modeling tool and an information management and collaboration platform, which can improve the efficiency and quality of the entire process of design, construction and operation. With the development and maturity of BIM technology, it is becoming more and more important for civil engineering professional education. In order to cultivate high-quality talents with modern engineering ability, more and more colleges and universities have introduced BIM competition in the teaching system to promote the development of students' practical ability and teamwork spirit in the form of competition. This study aims to deeply explore the importance of BIM competition in the field of civil engineering education, and further analyze its positive effects on students' professional accomplishment and career growth.

**Keywords:** BIM competition; Civil engineering; Professional education; Application value

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## Introduction

BIM technology was produced in the 1970s. In the context of the rapid development of computer technology and information technology in recent years, BIM plays a pivotal role in the information construction of the construction industry. BIM uses 3D digital model as the carrier, integrates various information in construction projects, and manages the whole process of design, construction and operation. In the field of civil engineering, BIM technology has a wide range of applications in architectural design, structural analysis, construction simulation, schedule management, cost control and many other aspects, significantly improving the efficiency and quality of the project.

## 1. The value of BIM competition in civil engineering professional education

### 1.1 Improve students' practical operation ability

BIM competition can significantly improve students' practical operation ability. By participating in the competition, students have the opportunity to apply BIM technology to practical engineering projects, which not only deepens their grasp of theoretical knowledge, but also enhances their ability to transform knowledge into practical skills. In the competition, students are required to skillfully use Revit, Navisworks, Civil 3D and other BIM software to conduct modeling, collision detection, construction simulation and schedule management in order to promote their software application. At the same time, the competition also requires students to solve problems existing in practical engineering, which requires students to design and optimize the scheme by combining various technical means to promote the development of their comprehensive analysis ability and innovation ability. In addition, BIM competition projects generally involve many professional fields. When performing tasks, students not only need the cooperation of multiple majors such as architecture, structure and mechatronics, but also need to integrate and analyze data, so as to develop their ability of cross-professional collaboration and system thinking. In practice, students can experience the whole process management of engineering projects from design to construction, understand the technical points and practical operation details of each link, so as to better grasp the application of BIM in actual projects.

### 1.2 Cultivate students' teamwork spirit

BIM competition has a significant advantage in cultivating students' teamwork spirit. During the competition, students were divided into groups that worked together to complete complex engineering projects. This teamwork mode requires students to effectively communicate and coordinate from many aspects such as task assignment, role positioning and resource integration, so as to deeply understand the significance of teamwork. Team members are required to perform different tasks such as architectural design, structural analysis and mechanical and electrical layout in combination with their professional background and technical expertise. In actual operation, members must constantly communicate with each other, give timely feedback on the work progress and problems encountered, and find solutions through collective discussion, so as to enhance their collaboration and problem-solving ability. In addition, BIM competition generally involves multi-professional

and multi-field cooperation, which requires team members to cooperate closely in project management, schedule control and quality monitoring. This kind of multi-disciplinary collaboration helps students break through professional barriers, develop their systematic thinking and comprehensive coordination ability, so as to serve their future career, and effectively cooperate with colleagues with different professional backgrounds.

### **1.3 Promote students' innovation ability**

BIM competition plays a significant role in promoting students' innovation ability. When students participate in the competition, they have to face a variety of complicated problems existing in the actual project, which requires students to explore new solutions while using the original knowledge. In the stage of project design and implementation, students use BIM technology to optimize the scheme innovatively, so as to enhance the scientific and practical design. The competition often inspires students to boldly explore new technologies and tools, such as virtual reality (VR), augmented reality (AR), and the Internet of Things (IoT), to improve the intelligence and detail of engineering projects. In this open competition environment, students can freely play their own ideas, and put forward and practice novel design concepts. In addition, the competition evaluation process is often reviewed by industry experts, in this process, middle school students not only get professional guidance but also get a deep understanding of innovative design and inspiration. This kind of innovative training that organically combines practice and theory enables students to promote the development of innovative thinking ability in practice and cultivate their innovative consciousness and ability in the process of future engineering practice.

## **2. Promotion strategy of BIM competition in civil engineering professional education**

### **2.1 Improve competition organization and management**

Improving the organization and management of BIM competition is an important guarantee to ensure the smooth development of the competition and achieve the expected educational effect. It is based on the establishment of clear competition rules and evaluation criteria, which should cover the competition schedule, entry qualification, submission requirements of works and scoring rules, and evaluation criteria should include technological innovation, design quality, team cooperation and project presentation. Thus ensuring the fairness and science of the competition. The organizer shall set up a professional competition committee composed of university teachers, industry experts, technical consultants, etc., to conduct overall planning, rule-making, technical support and review of the competition. It is also indispensable to provide comprehensive technical support and resource guarantee. The competition organizer shall provide the BIM software and hardware equipment required by the participating teams, and arrange corresponding technical training and guidance to ensure that students can skillfully use BIM technology to complete the competition task.

During the competition, a project management office should be set up to carry out daily coordination and communication for the competition, and deal with various problems and emergencies in the competition. The project management office shall establish an effective communication mechanism by holding regular meetings and online communication platforms to maintain close contact with the participating teams and the evaluation committee to ensure timely information transmission and feedback. In addition, competition organizers also need to develop appropriate reward strategies, such as setting up awards, providing internship opportunities and promoting outstanding works, so as to better stimulate students' passion for participation and innovative spirit. The review process should invite experienced experts in the industry to comprehensively investigate the technical level and innovation of the participating works through multiple rounds of review, on-site defense and other forms.

### **2.2 Strengthen teacher strength and training**

Strengthening the strength and training of teachers is of great significance to improve the quality and education effect of BIM competition. All colleges and universities should introduce professional teachers with rich BIM practical work experience, and conduct systematic BIM technology training for existing teachers, so that they can fully grasp the latest BIM software and its application methods. By organizing seminars, special lectures, training courses and other activities on a regular basis, teachers can not only improve their technical level, but also exchange teaching experience and communicate the experience and strategy of competition guidance. Establishing school-enterprise cooperation mechanisms, inviting industry experts and enterprise technicians to participate in teaching, competition guidance and other activities can further strengthen teachers' practical ability and industry vision. We provide teachers with a wealth of teaching resources, including BIM technology related books, online courses and practice case library, to ensure that teachers can always have access to the latest technical information and teaching strategies, so as to ensure that the teaching content is cutting-edge and practical application value. In the specific competition guidance, teachers should pay attention to teaching students according to their aptitude, and give personalized technical guidance and support according to students' professional background and interest direction. Through the continuous upgrading and training of teachers, a team of high-quality teachers needed for BIM competition can be cultivated, so as to further promote the reform and development of civil engineering

education and ensure that students get the best learning experience and practical results in the competition.

### 3. Conclusion

In short, BIM competition is of inestimable value to civil engineering professional education. The first is to enhance students' comprehensive skills through practical application, so that students can obtain comprehensive development in engineering design, project management, team cooperation and other work. Secondly, the application of BIM technology cultivates students' awareness of innovation and ability to solve complex problems, laying a solid foundation for future career development. Finally, the competition also promotes the development of school-enterprise cooperation, allowing students to have access to cutting-edge technology and practical experience in the industry. Therefore, BIM competition not only promotes the quality of education, but also provides a new way and concept for the training of civil engineering professionals. Through the continuous improvement and popularization of BIM competition, it can play a positive role in promoting the training of more high-quality engineering talents, and promote the continuous development and progress of China's civil engineering industry.

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