Computer-Aided Architectural Design Based on BIM Technology

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Abstract. This article seeks to investigate the potential of a computer-aided architectural design(CAAD) instructional platform utilizing BIM (Building Information Modeling) technology to enhance architectural design teaching outcomes and elevate students' digital design proficiency. To accomplish this objective, an integrated instructional platform is devised and implemented, aligning BIM technology's core functionalities with the practical demands of architectural design education. Through methods such as questionnaire surveys, practical operation tests, and achievement evaluations, instructional effectiveness is comprehensively and objectively assessed. The experimental results reveal that the platform significantly enhances students' digital design skills and fosters innovative thinking while also optimizing instructional resource allocation and boosting teaching efficiency to some extent. However, the study identifies several challenges and issues. Addressing these, the article proposes strategies like reinforcing foundational training, enhancing platform functionalities, and exploring effective integrations with traditional teaching methodologies. Ultimately, this article contends that the BIM-based CAAD instructional platform holds great promise and merits further promotion and refinement in future architectural design education.

Keywords: BIM Technology; Computer Aided Architectural Design; Instructional Platform; Evaluation Of Instructional Effect; Promotion Strategy
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1 INTRODUCTION

The current main solution in academia is to use Level of Detail (LOD) models to express 3D architectural models. However, existing methods for simplifying 3D architectural models often overlook texture factors, resulting in texture distortion and loss of detailed features in the simplified model [1]. One of the challenges faced in large-scale urban scenarios is how to efficiently store, manage, query, and calculate multi-resolution 3D building model data. The coverage of two-dimensional MuRan loan source data is an important new infrastructure for promoting the construction of two-dimensional real-scene databases and providing a unified spatial positioning

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framework and analysis basis for digital China. Real scene models can be combined with basic geographic information data to serve urban planning, construction, management, and other aspects [2]. As an important component of real scene 3D models, three-dimensional building models present fine and complex data characteristics and larger data volumes with the rapid development of data collection technology [3]. This poses new challenges to the existing high-resolution 3D building model data processing, storage, and transmission. In response to the above problems, some scholars have conducted research on 3D building model simplification technology that takes into account texture features, focusing on the simplification of models and the organization of model data [4].

Specifically, it includes a 3D building model mesh simplification algorithm based on "local vertex" texture features and a multi-resolution 3D building model data organization and management method based on global position mesh. At the same time, texture elements were introduced into the process of simplifying 3D architectural models, and a model simplification method that takes into account texture features was developed [5]. The key to generating LOD is to simplify the model to reduce its complexity, thereby achieving the goal of reducing the amount of model data. Keeping the important geometric and visual features of the model while minimizing its data volume and complexity as much as possible. Using data organization and management methods that conform to the structure of 3D building models for data management, to solve the problem of low query indexing and computational efficiency in large-scale urban 3D building model data [6]. This algorithm uses geometric and texture factors to optimize the quadratic error metric, which can preserve the appearance of the original 3D building model to the greatest extent possible, and make the texture information-rich areas of the 3D building model more fully preserved, thereby achieving better visualization effects. In response to the problem that existing 3D building model simplification algorithms cannot effectively preserve model details and are prone to texture distortion, some studies have proposed a 3D building model mesh simplification algorithm based on "local vertex" texture features. Design a multi-resolution 3D building model data organization and management method based on a global location grid. Utilizing the recursion and global uniqueness of GeoSOT grid coding to establish urban feature sets and regional features [7].

It integrates all pertinent information of a building project into a unified model, enabling information sharing and collaborative work throughout the project's lifecycle [8]. BIM technology not only enhances the efficiency of architectural design and construction but also significantly boosts project management's accuracy and controllability. Its core lies in establishing a three-dimensional digital model encompassing all building elements and attributes. This model allows project team members to share information and collaborate in real time, effectively improving the project's overall quality and efficiency [9].

The main purpose of this study is to design a CAAD instructional platform based on BIM and apply it to the actual architectural design teaching, to improve the instructional effect and cultivate students' digital design ability. Its innovation is mainly reflected in the following aspects:

Design and implement an instructional platform that integrates the core functions of BIM and the teaching requirements of architectural design. This integrated design not only improves the optimal allocation of instructional resources but also provides students with an all-round and multi-functional learning environment.

A comprehensive and objective evaluation of the instructional effect was made by combining various methods such as questionnaire survey, practical operation test and achievement display evaluation. This multi-dimensional evaluation method can more accurately reflect the actual effect of the instructional platform and provide a scientific basis for subsequent teaching improvement.

Given the problems and challenges found in teaching practice, some strategies and suggestions are put forward, such as strengthening basic training, perfecting the function of the instructional platform and exploring effective ways to combine with traditional instructional methods. These strategies and suggestions are aimed at further improving instructional effect and optimizing students' learning experience.

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Firstly, this article analyzes the application advantages and present situation of BIM in architectural design; Then a CAAD instructional platform based on BIM technology is designed and implemented. Finally, the platform is applied to the actual architectural design teaching, the instructional effect is evaluated and the promotion strategy is studied.

2 RELATED WORK

BIM technology is profoundly changing the mode and methods of architectural design teaching. Liu et al. [10] conducted a thorough reflection on the teaching practice of architectural design courses, particularly the challenges and opportunities faced in introducing students to this complex and multidimensional discipline. On this basis, the analytical perspective has been further expanded. Revit Architecture is currently the mainstream 3D architectural design software. The Rvt file contains geometric and attribute information of the building model, and the private data format is not held by the web. The geometric data and attribute data in the Rvt file are stored in the OBJ model area and attribute area of the JSON file, respectively, and are associated with the model object and attribute object through UID. Separate geometric information and attribute information using Revit API, convert geometric information into OBJ format files and store them separately in the geometric X field and attribute area of the JSON file. Extract the model file from JSON using the biLoader library and pass it to WebGL to redraw the model file on the browser side. Combining Revit 3D building models with WebGL display technology, Lizondo et al. [11] studied the use of WebGL to reconstruct and display Revit Architecture 3D building models on the browser side. At the same time, by setting the Canvas window size and rearranging the display position, the function of quickly drawing models on mobile devices has been achieved, laying the foundation for 3D building data applications based on mobile devices. Through data association, it is possible to view the shape and properties of building models on the browser side, which can meet the requirements of users to view models on mobile devices without using Revit software. Based on the industry application background, Ma et al. [12] started by integrating the most representative IFC standard and CityGML standard in BIM and GIS. We have conducted research on data fusion technology in the field of architecture based on semantic constraints, using four main steps: geometric information, multi-scale semantic mapping, geometric expression reconstruction, and attribute information association. Wang et al. [13] studied the concepts of the IFC standard and CityGML standard and analyzed their characteristics and similarities and differences from three aspects: standard architecture, geometric expression, and semantic description. Import BIM single-building models with rich attribute information as data sources into GIS platforms capable of large-scale spatial display. Combine with the surrounding 3D geographic information to build a 3D visualization scene that integrates BIM and GIS data.

Wang et al. [13] chose the SuperMap platform as the GIS development platform for studying the integration of BIM and GIS data, ensuring the individualized management of building model components and consistency and integrity before and after data conversion. The paper proposes a technical route for converting IFC standard building models to CityGML standard data and compares the functions and data formats of traditional 3D modelling platforms and BIM modelling platforms in the construction industry. Analyzed the advantages of component individualization and information management in Revit software based on BIM technology, to draw BIM building models and integrate them with GIS platforms. At the same time, the characteristics of different 3D GIS platforms and their display effects and semantic inheritance capabilities on BIM 3D building models were studied. Taking a small villa as an example, a BIM model is drawn using Revit software, and the data conversion from BIM to GIS is achieved through the SuperMap plugin, along with the geographic information data of the surrounding environment. It often overlooks the subjective considerations of architects and designers in terms of aesthetics, functionality, and cultural sensitivity. This process not only enriches the diversity of design schemes but also promotes the transformation of architectural design from "technology orientation" to "equal emphasis on technology and art." Meanwhile, students can also engage in practical operations through the BIM platform, experiencing firsthand the impact of design parameter adjustments on structural forms, thereby cultivating their innovative thinking and practical abilities. Yan et al. [14] customized designs based on specific project requirements, such as

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spatial layout, process planning, visual effects, etc. During the teaching process, teachers can use BIM software to vividly demonstrate to students the calculation process of topology optimization, the effect of parameter adjustment, and the final structural form, Zhao et al. [15], helping them to understand the principles and applications of topology optimization deeply. In the integration of topology optimization and architectural design, engineers, architects, structural engineers, and other professionals can seamlessly communicate and collaborate based on BIM platforms to explore more efficient, aesthetically pleasing, and sustainable building solutions.

The basic principle of BIM is to establish a three-dimensional digital model that includes all elements and attributes of the building and to achieve information sharing and collaborative work throughout the project lifecycle through this model. This 3D digital model includes not only the geometric shape and appearance of the building but also all relevant information, such as building materials, structures, equipment, and costs. Thirdly, BIM technology has strong collaborative capabilities and can support real-time collaboration across multiple disciplines and teams, improving the efficiency of design team collaboration. Finally, BIM technology can also provide rich data analysis functions to assist designers in performance analysis and optimization design. These advantages give BIM technology broad application prospects and potential in the field of architectural design.

3 DESIGN OF INSTRUCTIONAL PLATFORM FOR CAAD

3.1 Instructional Platform Design Objectives

The design objectives of the CAAD instructional platform based on BIM technology mainly include the following aspects: firstly, provide an integrated teaching environment, closely combine the core functions of BIM with the teaching requirements of architectural design, and realize the optimal allocation of instructional resources; Secondly, through the teaching function of the platform, students' digital design ability and innovative thinking can be improved, so that they can adapt to the demand of digital talents in the future construction industry; Finally, the quantitative evaluation and feedback of instructional effect are realized, which provides scientific teaching basis for teachers and continuously optimizes instructional methods and contents.

3.2 Functional Module Division of Instructional Platform

This module is the core component of the instructional platform, which is dedicated to providing the three-dimensional modelling function of architectural elements and allowing users to manage the model and define the attributes. Among them, three-dimensional modelling is the key content of this module, which provides an intuitive and accurate environment for students and teachers to create architectural models. In the aspect of three-dimensional modelling, the module provides a wealth of modelling tools and functions, enabling users to create three-dimensional geometric shapes of architectural elements easily. Users can generate the required three-dimensional model by inputting specific dimensions and parameters or using the preset building element library, shown in Figure 1.

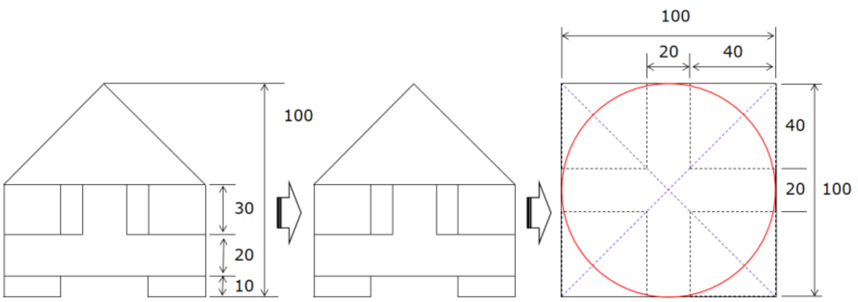

Figure 1: The process of three-dimensional modeling.

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In the process of creating a 3D model, the module also supports some basic geometric operations and formulas to help users define the shape and size of the model more accurately. Three-dimensional models are created by geometric transformations such as translation, rotation and scaling.

Translation:

$$T_{tx,ty,tz} \;\; P \;=\; x+tx, y+ty, z+tz \tag{1}$$

Rotation:

$$R_z \;\; \theta \;\; P \;=\; x\cos\theta - y\sin\theta, x\sin\theta + y\cos\theta, z \tag{2}$$

Rotate θ degrees around X axis:

$$R_x \;\; \theta \;\; P \;=\; x, y\cos\theta - z\sin\theta, y\sin\theta + z\cos\theta \tag{3}$$

Rotate θ degrees around Y axis:

$$R_y \;\; \theta \;\; P \;=\; x\cos\theta + z\sin\theta, y, -x\sin\theta + z\cos\theta \tag{4}$$

Zoom:

$$S \;\; sx, sy, sz \;\; P \;=\; sx\cdot x, sy\cdot y, sz\cdot z \tag{5}$$

A parametric surface can be expressed as:

$$S \;\; u,v \;\; = P_0 + u\cdot P_1 + v\cdot P_2 + u^2\cdot P_3 + uv\cdot P_4 + v^2\cdot P_5 + \ldots \tag{6}$$

The symbols in the above formula have the following meanings:

$T_{tx,ty,tz}$: represents a translation transformation, where tx, ty, tz are translation quantities along x axis, y axis and z axis respectively.

$R_z \; \theta, R_x \; \theta, R_y \; \theta$: Represents the rotation transformation around x axis, y axis and z axis respectively, and θ is the rotation angle.

$S \; sx, sy, sz$: represents a scaling transformation, where sx, sy, sz are scaling factors along x axis, y axis and z axis respectively.

P : indicates the position of a point in three-dimensional space, usually expressed as $P = \; x, y, z$.

P_0 : Represents a reference point on a plane.

x, y, z : Represents the coordinates of points P in the three-dimensional coordinate system.

x_0, y_0, z_0 : Represents the coordinates of the reference point on the plane.

θ : Indicates the angle of rotation, usually expressed in radians.

x, sy, sz : Represents the scaling factor, which is used to adjust the size of the model in the directions of x axis, y axis and z axis.

In addition to the three-dimensional modelling function, the BIM model creation and management module also allows users to add detailed attribute information to the model. These attribute information include the type, size, manufacturer, etc. of materials, as well as the relationship with other building elements. By defining this attribute information, users can fully understand the characteristics and performance of the building model and provide accurate data support for subsequent design and analysis. In addition, in the aspect of model management, the module provides effective organization, storage, and retrieval functions. Users can classify and name the created BIM models for better management and search. At the same time, the module also supports the version control function of the model, which enables users to track and manage different versions of the model and ensure the continuity and consistency of the design work.

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The collaborative design module is a key part of the instructional platform, which supports multi-user online collaboration and breaks the geographical and time constraints in the traditional design mode. Through this module, teachers can assign design tasks to students, track the design progress in real-time, and ensure that all team members can share and access the latest design results in time. This collaborative work not only improves the design efficiency but also promotes cooperation and communication between students.

To help students better optimize the design scheme, the instructional platform integrates building performance analysis tools, such as energy consumption analysis and sunshine analysis. These tools can deeply evaluate the performance of the BIM model and provide accurate data and visual reports so that students can understand the actual effect of the design scheme more intuitively and make necessary adjustments and optimizations accordingly.

The instructional resource management module is a key part of the instructional platform, which is dedicated to creating a centralized and efficient instructional resource management and sharing environment. This module not only provides a convenient way for teachers to upload, edit and manage instructional resources but also creates a learning space for students to download, browse online and obtain personalized resource recommendations.

In the instructional resource management module, teachers can easily upload various types of instructional resources, including but not limited to teaching courseware, classic case base, detailed video tutorials and the latest research reports in the industry. These resources are carefully selected and sorted by teachers, aiming at providing students with rich, comprehensive and in-depth learning materials. At the same time, teachers can also edit and update these resources to ensure the timeliness and accuracy of teaching content. For students, the instructional resource management module is a valuable learning treasure house. They can download and browse these instructional resources online anytime, anywhere, whether they are previewing new knowledge, reviewing old content or delving into a special topic, they can find learning materials that suit them. This not only greatly improves students' learning efficiency, but also cultivates their autonomous learning and inquiry ability. It is worth mentioning that the instructional resource management module also has an intelligent resource recommendation function. By analyzing students' learning behaviour, grades and interest preferences, this module can recommend the most suitable instructional resources for students.

Suppose there is a user-project rating matrix R, in which the element R R represents the user r_{ui} 's rating of the project (instructional resource) u.

$$R = \begin{bmatrix} r_{11} & r_{12} & \dots r_{1n} \\ r_{21} & r_{22} & \dots r_{2n} \\ \dots & \dots & \dots \\ r_{m1} & r_{m1} & \dots r_{mn} \end{bmatrix} \tag{7}$$

Where m is the number of users and n the number of projects.

User similarity can be calculated by cosine similarity and Pearson correlation coefficient. The following formula uses cosine similarity:

$$Sim\ u,v = \frac{\sum_{i \in I_{ui}} r_{ui} \cdot r_{vi}}{\sum_{i \in I_{uv}} r_{ui}^2 \cdot \sum_{i \in I_{uv}} r_{vi}^2} \tag{8}$$

Where $Sim\ u,v$ is the similarity between user u and user v, and I_{uv} is the set of items that both user u and user v have scored.

Use similar users' scores to predict the target users' scores on unrated items:

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$$\hat{r}_{ui} = \frac{\sum_{v \in N\ u} Sim\ u,v\ \cdot r_{vi}}{\sum_{v \in N\ u} \left| Sim\ u,v \right|} \tag{9}$$

Where $\hat{r}_{ui}$ is the prediction score of the user u on project i, and $N\ u$ is a collection of users similar to user u.

Finally, recommend k unrated items with the highest score for the user u:

$$\mathrm{Re}c\ u\ =\ i_1, i_2, i_3, \ldots, i_k, \left| r_{ui1} \geq \right| r_{ui2} \geq \left| r_{ui3} \geq \ldots \right| \hat{r}_{uik} \tag{10}$$

These recommended resources not only cover the key and difficult points of students' current learning content but also extend to expand their knowledge in related fields, thus helping students to build a more complete and systematic knowledge system.

Teaching achievement display and evaluation module

The display and evaluation of teaching achievements is an important link in the teaching process. This module provides the online display function of students' works so that students can share their design results with other students and teachers. At the same time, it also supports the functions of mutual evaluation and teacher evaluation, encourages students to learn from each other and evaluate each other, and provides teachers with a convenient evaluation tool so that they can give students feedback and guidance in time.

4 APPLICATION AND PRACTICE OF INSTRUCTIONAL PLATFORM

4.1 Application Scene Design of Instructional Platform

The application scenarios of the instructional platform mainly include classroom teaching, curriculum design, graduation design, and students' autonomous learning. In classroom teaching, teachers can use the platform to explain and demonstrate BIM technology and guide students to practice. In the course and graduation designs, students can use the platform to design, analyze, and optimize the architectural scheme. In students' autonomous learning, the platform provides rich instructional resources and case bases to help students consolidate their knowledge and improve their skills.

The implementation plan of teaching practice includes the following steps: to investigate and analyze the teaching needs and determine the instructional objectives and contents; Make detailed teaching plan and schedule to ensure the smooth progress of teaching practice; Organize teachers to carry out platform use training and instructional design training to improve their teaching ability and platform use level; Implementing teaching practice, including classroom teaching, practical operation, achievement display and evaluation; Summarize and feedback the teaching practice, and constantly optimize the instructional methods and contents.

4.2 Analysis of Specific Cases in Practice

In teaching practice, we can choose some specific construction projects as cases to guide students in carrying out BIM design practice. This section selects a campus building and a public building as the design object and requires students to use the platform to model, analyze and optimize the architectural scheme. Through practical operation, students can deeply understand the application process and advantages of BIM, and improve their digital design ability and innovative thinking. At the same time, teachers can also explain and expand knowledge points in combination with cases to help students combine theoretical knowledge with practical operation.

After the teaching practice, to comprehensively and objectively evaluate the instructional effect of the CAAD instructional platform based on BIM, this section adopts a combination of various evaluation methods. Specifically, it includes: the questionnaire survey method, which collects feedback from students and teachers on the use experience and instructional effect of the

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instructional platform by distributing questionnaires; the Practical operation test method, by designing a series of practical operation tasks related to architectural design, evaluates students' practical operation ability and design level after using the instructional platform; And the achievement display evaluation method, which organizes students to display the design achievements completed by using the instructional platform, invites industry experts and teachers to evaluate and evaluate the instructional effect from a professional perspective. Before and after learning, the students' design cases are shown in Figure 2 and Figure 3:

Figure 2: Students design cases (Before study).

By analyzing the above student design cases, we can get the following:

Before study: Students' design relies more on traditional hand-drawn or simple two-dimensional design software, and the design details and accuracy are limited, so it is difficult to fully consider the actual construction and maintenance needs of the building.

After learning: By modelling with BIM technology, students can create more accurate and detailed 3D models and consider more design parameters, thus improving the overall quality and feasibility of the design.

Before learning: students lack effective tools and methods to conduct a comprehensive performance analysis of the design scheme, and the optimization process may be limited.

After study: With the help of the analysis tools of the BIM platform, students can conduct multi-dimensional performance simulation and optimization, such as energy efficiency analysis and structural stress testing, so as to make more scientific design decisions.
Before learning: students' design ideas are limited by traditional design methods and material selection, and their innovative thinking is restricted to some extent.

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Figure 3: Students design cases (After study).

After learning: The use of BIM encourages students to explore new design concepts and technical applications, such as parametric design and sustainable building strategies, which promotes the development of innovative thinking.

Figure 4 shows the evaluation of teachers and industry experts on the instructional platform, and Table 1 shows their feedback and suggestions on the instructional platform.

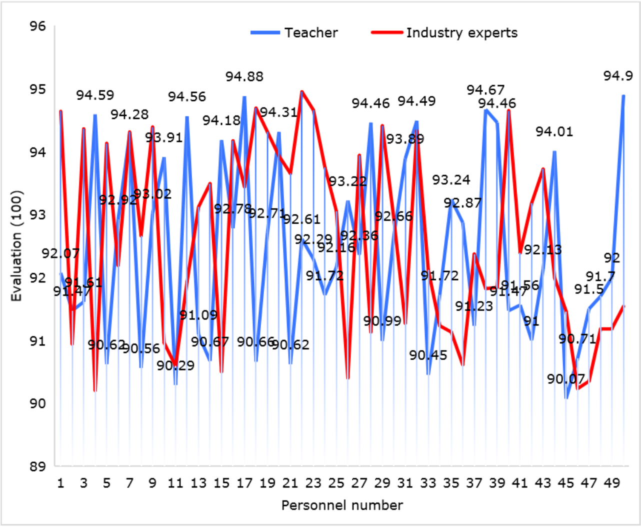

Figure 4: Evaluation of instructional platform by relevant personnel.

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Personnel Type	*Feedback Details*	*Specific Suggestions*
Teachers	The platform interface is generally user-friendly and easy to navigate. Some functions (such as grade entry, and course editing) are not intuitive and require multiple clicks.	Add an operation guide document providing step-by-step explanations. Create video tutorials for function operations to help teachers get started quickly.
Students	The learning resources are diverse and meet different learning needs. Some courses lack interactivity and real-time feedback mechanisms.	Add an online discussion area to the courses to encourage student interaction. Introduce real-time Q&A functionality to enhance teacher-student interaction.
Industry Experts	The platform content covers a wide range of knowledge points and has educational value. The connection with current industry trends is not tight enough, and there is a lack of up-to-date case studies.	Regularly update course content to ensure it is in sync with industry developments. Introduce more practical case studies and hands-on projects to enhance practicality.

Table 1: Feedback and suggestions from relevant personnel.

The instructional platform and instructional methods will be continuously optimized through the feedback and evaluation of students and the guidance and suggestions of industry experts, so as to improve the instructional effect and students' satisfaction.

In order to show the instructional effect more intuitively, this section makes a quantitative analysis of the collected evaluation data. Specific indicators include: students' scores in practical operation tests, which are used to evaluate their practical operation ability and design level (Figure 5); Students' satisfaction scores on the instructional platform used to evaluate the user experience and popularity of the instructional platform (Figure 6); And teachers' evaluation scores of students' design achievements are used to evaluate the effect of the instructional platform in improving students' design ability (as shown in Figure 7). Through the quantitative analysis of these indicators, we can understand the instructional effect more accurately and provide data support for subsequent teaching improvement.

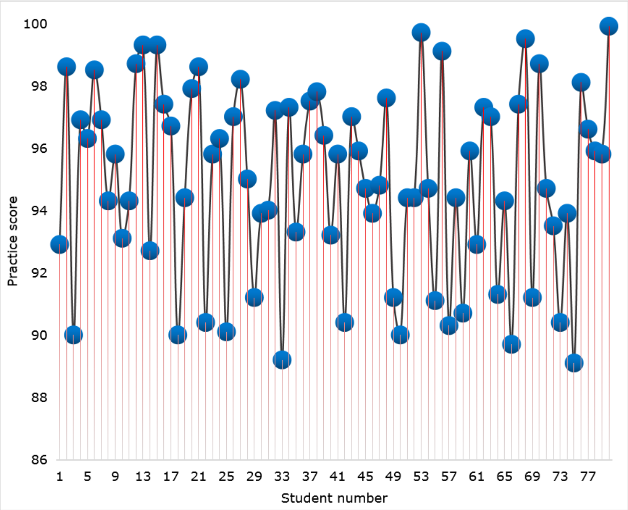

Figure 5: Students' practice scores.

Judging from the students' practical scores, most students performed well in the practical operation test, with a high average score (89 points), which shows that they have certain abilities in practical operation and design. The highest score is close to the full mark (100 points), which shows that some students have performed well, while the lowest score is not high, but it has reached the passing level, which shows that the whole student group has a certain foundation in practical operation.

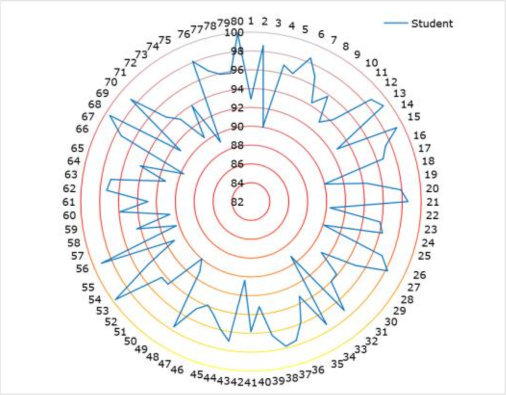

Figure 6: Student satisfaction score.

Students' satisfaction was scored on a five-point scale, with an average score of 4.5, the highest score of 4.9 and the lowest score of 3.2. It can be seen that students' satisfaction with the instructional platform is high, and the average score is close to the highest score, which shows that the instructional platform performs well in user experience and popularity. The highest score shows that some students are very satisfied with the instructional platform, while the lowest score is relatively high, which shows that even students who are not satisfied have certain recognition of the platform.

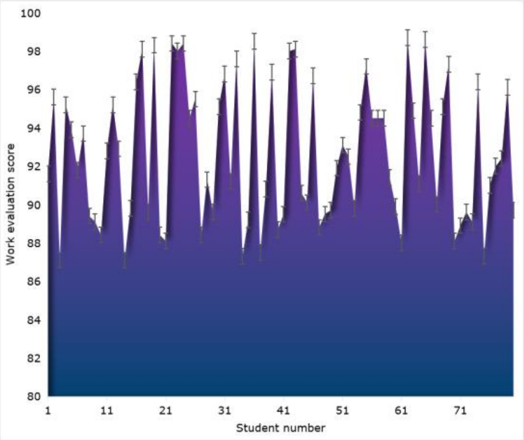

Figure 7: Evaluation score of students' design achievements.

From the analysis, it can be concluded that the evaluation score of teachers on students' design achievements is high, with an average score close to 90 points, which shows that the instructional platform has achieved remarkable results in improving students' design ability. The highest score is close to 99 points, indicating that some students' design achievements have been highly praised by

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teachers, while the lowest score is relatively high (87 points), indicating that the overall students' design ability has been improved.

5 CHALLENGES AND PROMOTION STRATEGIES

5.1 Problems and Challenges

In the practice of the CAAD instructional platform based on BIM technology, we also encountered some problems and challenges. First of all, due to the complexity and professionalism of BIM, some students have certain learning difficulties when they first come into contact and need more time and guidance to adapt and master it. Secondly, the function and performance of the instructional platform need to be further improved and optimized to meet the growing teaching needs and enhance the user experience. In addition, due to the particularity and diversity of architectural design teaching, how to better combine BIM technology with traditional instructional methods to maximize the instructional effect is also a problem that needs constant exploration and research.

5.2 Strategies and Suggestions for Improving Instructional Effect

In view of the above problems and challenges, this section puts forward some strategies and suggestions to improve the instructional effect. First of all, strengthen students' basic training and practical guidance on BIM technology to help them master this technology faster and better. Secondly, continuously optimize and improve the function and performance of the instructional platform, and improve the user experience and instructional effect. At the same time, actively explore effective ways to combine BIM technology with traditional instructional methods, such as combining traditional design methods such as hand-drawn sketches and physical models, so as to enrich students' design thinking and expression. In addition, we can strengthen cooperation and exchanges with industry experts, introduce more practical project cases and instructional resources, and improve the practicality and pertinence of teaching.

6 CONCLUSIONS

Based on BIM technology, this study designed and implemented a CAAD instructional platform, and applied it to practical architectural design teaching. Through teaching practice and effect evaluation, it is proved that the platform is effective in improving students' digital design ability and innovative thinking. At the same time, the article also found some problems and challenges in teaching and put forward corresponding solutions and suggestions.

With the digital transformation of the construction industry and the wide application of BIM, CAAD teaching based on BIM technology will become an important trend in architectural design education in the future. For future research, this article suggests further exploring the specific application methods and effect evaluation system of BIM in architectural design teaching. BIM teaching courses and practical tasks with different difficulties and levels can be designed for students of different grades and majors. We can also develop more instructional resources and case bases to enrich the teaching content and improve the instructional effect. In addition, we can also pay attention to the latest development and application trend of BIM in the construction industry, and introduce new technologies and methods into the instructional platform in time to maintain the timeliness and foresight of teaching.

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