

Study on Architectural Drawing and AutoCAD Course System based on Combination of "Post, Course, Certificate and Competition"

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Abstract

This article is based on the training of Architectural recognition and Architectural drawing, based on job skill standards, Architectural recognition vocational skill competition, 1+X Architectural drawing verification, and training high-skilled technical talents required by the profession. By setting up courses for the process of completing typical tasks, constructing a curriculum system of "competence-based, vocational skills as the main line, and project courses as the main body", and designing a teaching system of "gradual advancement of knowledge and skills, and gradual improvement of competence and literacy". Through the integrated curriculum design of "Post, Cours, Certificate, Competition", the integration mode of "Post, Cours, Certificate, Competition" is used to reconstruct the curriculum structure, which clarifies students' learning motivation and improves students' learning enthusiasm.

Keywords

Post-Cours-Certificate-Competition, architectural drawing and autocad, curriculum restructuring.

1. Introduction

In order to promote the high-quality development of vocational education, and greatly improve the modernization level and service capabilities of vocational education in the new era, the state has initiated the implementation of the "Action Plan for the Improvement of the Quality of Vocational Education (2020-2023)". The realization of the improvement of the quality of vocational education requires value-added resources can.[1] This course adopts the talent training model of "Post, Cours, Certificate, Competition", and carries out the "Post, Cours, Certificate, Competition" integrated curriculum design: The curriculum content meets job requirements, professional standards and work processes, absorbs new knowledge, new technology, new technology, and new methods of industry development. Professional course textbooks are jointly developed by school and enterprise, and the teacher team is a modular teaching organization method with division of labor and collaboration; Based on the diversified characteristics of students, establish a course teaching evaluation system with students as the main body; Improve the teaching level of teachers and the professional level of students through the architectural drawing contest and the 1+X architectural drawing vocational skill level certificate examination.

2. Reform Background and Main Problems

In engineering majors, in order to meet the requirements of modern enterprises for high-quality mechatronics technical professionals who "know technology, know how to operate, be able to innovate, and be good at cooperation", Genlian Yang[2], Weide Qiao[3], Lina Zhu[4] and

others through research and analysis, in-depth school-enterprise cooperation, analyzed the job content, refined typical work tasks, combined with professional related professional qualification certificates and analysis of competition items, and constructed a mechatronics integration of "Post, Cours, Certificate, Competition". An Jiang[5,6] aimed at the software technology professional group, based on the integration mechanism of "Post, Cours, Certificate, Competition", built a core curriculum system, and promoted the teaching mode of "project guidance, task drive, learning and doing" in practical courses. After the reform Obvious results have been achieved in the construction of the core curriculum system. The professional counterpart rate of graduates has steadily increased, and the passing rate of vocational qualification certificates and skill competitions have also achieved good results.

Architectural drawing and CAD is a very practical professional basic course, and practical teaching is an effective way to consolidate theoretical knowledge and improve skill level, and it is an important link in cultivating skilled and applied talents. According to the talent training requirements of "production, study, research and application", optimize the practice system, integrate existing resources, strengthen cooperation with relevant regional enterprises, build a training base for integration of production and education, and give full play to the advantages of the production, education and training base for the society Cultivate professional talents to provide support. [7].

Vocational education and teaching have achieved certain effects through the integrated curriculum design of "Post, Cours, Certificate, Competition". However, there are not many discussions on how to integrate basic courses with "post-match certificate". This article will study the restructuring design of professional basic courses.

3. "Post-Cours-Certificate-Competition", Analysis of Curriculum

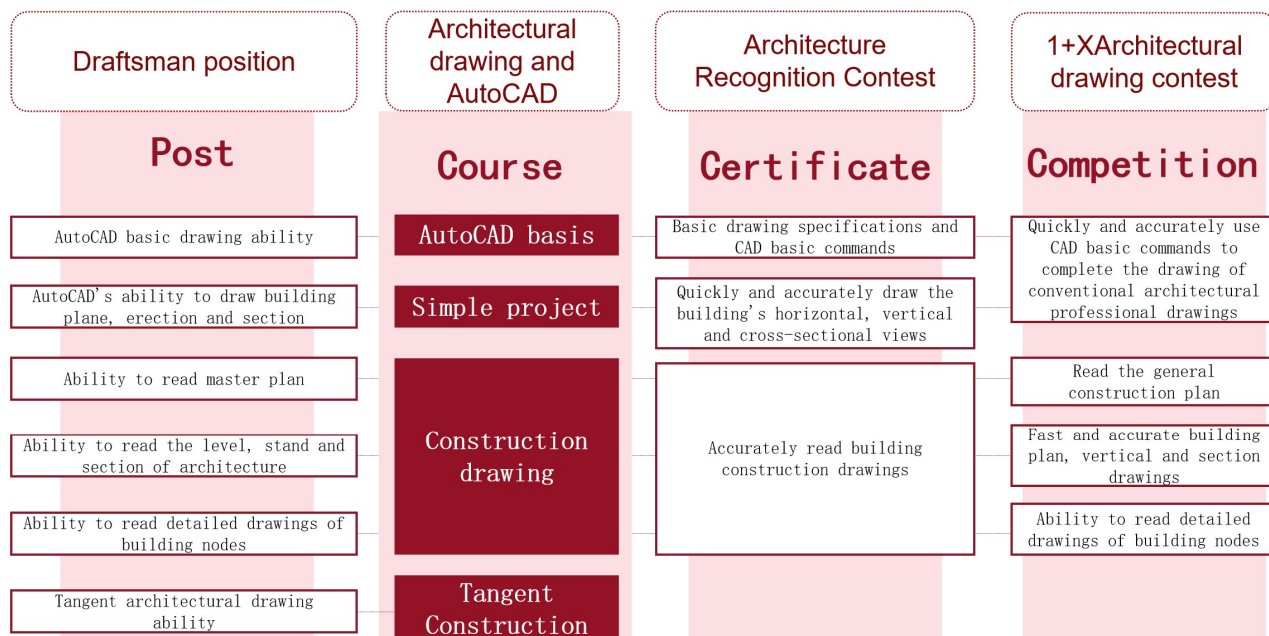


Figure 1. "Post-Cours-Certificate-Competition" Course Design

Starting from the actual skills needs of the job, formulate curriculum training programs to achieve the integration of theory and practice; through different forms of skills competitions as a practical platform, what you learn is also the key to vocational skills certificate training, so as to achieve the effect of obtaining evidence to promote employment and improve students Practical ability, professional quality and enhance students' self-confidence in employment.[8] Architectural drawing and CAD courses are based on the job-oriented position, combined with

the assessment content in the architectural drawing 1+X certificate and the skill points of the architectural drawing contest to reconstruct the curriculum system.

In the selection of course teaching content, teaching organization and implementation, and teaching evaluation methods, the new needs and new technical skills of the job are fully reflected, and the 1+X skill certificate assessment content and the skill points of the skill competition are transformed into teaching resources and integrated into teaching the process is shown in Figure 1.

3.1. Job Analysis

Architectural drawing and AutoCAD courses are mainly oriented to the needs of architectural draftsmen. They are required to understand the technical terms in architectural drawings and be able to draw architectural drawings quickly and accurately. With the refinement of the industry's drawing division, the drawing requirements are becoming more and more standardized. The chief designer completes the sketch of the plan. The draftsman needs to refine the sketch according to the standard. The basic requirements are to be able to read and draw architectural plans, elevations, and sections. With detailed drawings of common nodes, advanced requirements require accurate drawing of the general plan, docking assistant designer positions, and the ability to print out diagrams. From the drawing specifications to the drawing requirements of the building horizontal and vertical section, we strive for perfection, carefully and patiently draw accurately.

3.2. Course Content

With the change of architectural design draftsman's position, the profession has also been adjusted appropriately, in order to fully meet the diversified requirements of the new era draftsman's job knowledge and ability, as well as the needs of job changes, the teaching content of the "Architectural Drawing and AutoCAD" course Reasonable adjustments are also needed, from the original teaching of drawing and drawing separately from AutoCAD content, to the teaching of drawing and drawing together with AutoCAD. Among them, the teaching content of architectural drawing and AutoCAD is AutoCAD foundation, small building construction drawing reading and drawing, building construction drawing reading and drawing.

3.3. Certificate Analysis

The certificate related to the course is the 1+X Construction Engineering Drawing Professional Skill Level Certificate. Higher vocational students mainly take the primary and intermediate exams. Primary architectural drawing recognition and AutoCAD drawing operations need to master general architectural drawing basic theories and basic architectural design expertise; able to independently complete drawing reading and drawing work in accordance with the specifications. The intermediate level mainly focuses on the reading and drawing of construction drawings of building structures.

3.4. Game Analysis

All professional students of construction engineering in higher vocational colleges can participate in the architectural drawing competition. The specifications are relatively high. All higher vocational colleges in the province attach great importance to the competition. The competition is particularly fierce every year. Therefore, the curriculum teaching team re-edited the curriculum supporting new forms of teaching materials, appropriately adding knowledge, abilities and quality requirements related to skill competitions, and rearranging the key points and difficulties of each task.

4. Teaching Reform Practice

4.1. Design Concept

The course content is reconstructed based on the job position for the course, combining the assessment content in the 1+X certificate of architectural engineering drawing and the skill points of the architectural drawing contest. Based on the reconstruction of the course content, according to the job content and requirements of the job, the skill points of the 1+X certificate and the skill points of the skill competition, a project-based basic course is constructed. In the selection of course teaching content, teaching organization and implementation, and teaching evaluation methods, the new needs and new technical skills of the job are fully reflected, and the 1+X skill certificate assessment content and the skill points of the skill competition are transformed into teaching resources and integrated into teaching process.

In view of the disconnection between the existing courses and the real work tasks of the company, in order to further realize the needs of students for seamless on-the-job internships, the courses are designed as projects, and eachP task adopts a cyclical consolidation practice teaching mode. The curriculum draws on the new model to simulate the real corporate environment in the school, introduce real corporate projects, strengthen key breakthroughs, and deepen students' understanding and application of the knowledge they have learned, and cultivate innovation and practical ability.

4.2. Restructuring the Curriculum System

“Architectural Drawing and AutoCAD” is a course mainly on teaching students to draw graphics through the conversion of three-dimensional graphical information into two-dimensional graphics. The content of the course is rather abstract and so that difficult for the students to understand. It requires the students to have certain ability of spatial imagination. In traditional teaching mode, the teaching of the software AutoCAD is separated into two forms of independent teaching, graphics recognition and teaching of the software AutoCAD, respectively[9].

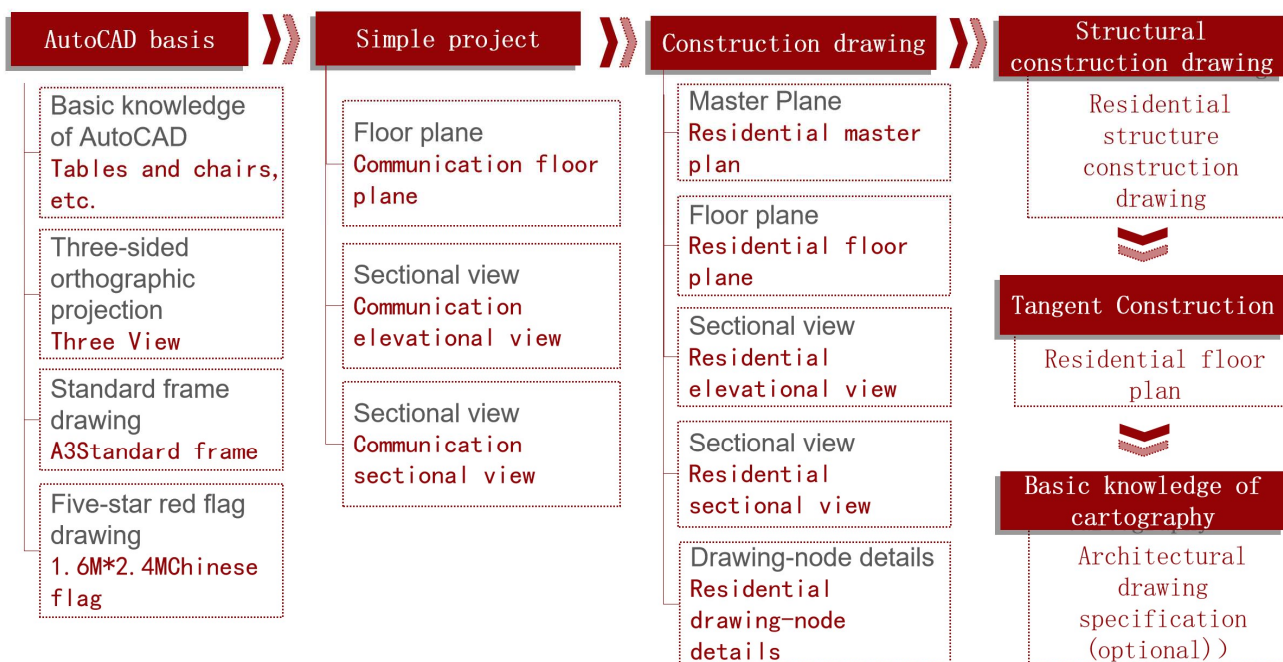


Figure 2. Curriculum system reconstruction

Through courses, job positions, skills certificates, and skills competitions, a practical teaching system is constructed according to the three levels of basic projects, small projects, and advanced projects. Among them, the basic projects mainly focus on mastering the basic principles, basic methods, and operating specifications of architectural drawing and CAD, and lay a solid foundation for students' skills and operations. Afterwards, entering simple projects and building construction drawing learning mainly uses practical training projects, skills verification, and innovative courses as the carrier to improve students' analytical skills. In-class and extra-curricular practice exercises focus on improving the application level of skills and lay the foundation for solving practical drawing problems, such as As shown in Figure 2.

4.3. Optimize Practical Teaching Content

In accordance with the docking of majors with industries and professional positions, the docking of professional courses with professional standards, the docking of teaching and working procedures, the docking of academic certificates with professional qualification certificates, the effective connection of professional syllabus and certificate examination syllabus, and the occupation of "cartographer" The content of the qualification certificate examination and the content of the national skills competition are integrated into practical teaching to increase the passing rate of the student "drafter" professional certificate.

4.4. Optimize Curriculum Teaching Resources

In order to give full play to the role of teaching resources and results, and mobilize students' learning enthusiasm, with the help of the MOOC platform of Chinese universities and the national teaching resource database platform, the design and development of "architectural drawing and CAD" course network resources. The drawing specifications, basic operations, and theoretical knowledge of common architectural drawing and drawing are granulated into short videos. At present, 80 video resource construction has been completed.

4.5. Evaluation System

Based on job requirements, learn from the successful experience of vocational skill competitions: use competition to promote learning, use competition to promote training, use competition to promote teaching, use competition to promote reform, and use competition to promote the successful experience of construction. The requirements of the National Vocational College Architectural Drawing Competition have effectively promoted the transformation of the teaching concept of the practical teaching course of "Architectural Drawing and CAD" from "supply-driven" to "demand-driven". Shift from the traditional classroom theory teaching as the center to practical teaching as the center, and promote the school-enterprise cooperation and work-learning teaching organization form; Shift from focusing on imparting theoretical knowledge to focusing on vocational skills training and strengthening practical teaching; to achieve the combination of doing and learning, implement integrated teaching, and promote the transformation of practical teaching evaluation methods to "certificates for examinations, competitions for examinations, and competition certificate integration" [10].

In the case teaching process of architectural drawing and CAD course projects, it fully reflects that the teaching goals are driven, and the assessment is carried out in accordance with the requirements and standards of the "post class certificate", and continuously circulates advanced optimization to ensure the quality of teaching. Combining corporate job evaluation standards, vocational qualification evaluation standards, and skills competition evaluation standards to form a comprehensive evaluation method, and constructing an ability-based full-process evaluation mechanism, which greatly improves students' understanding rate in class, as shown in Figure 3 Show.

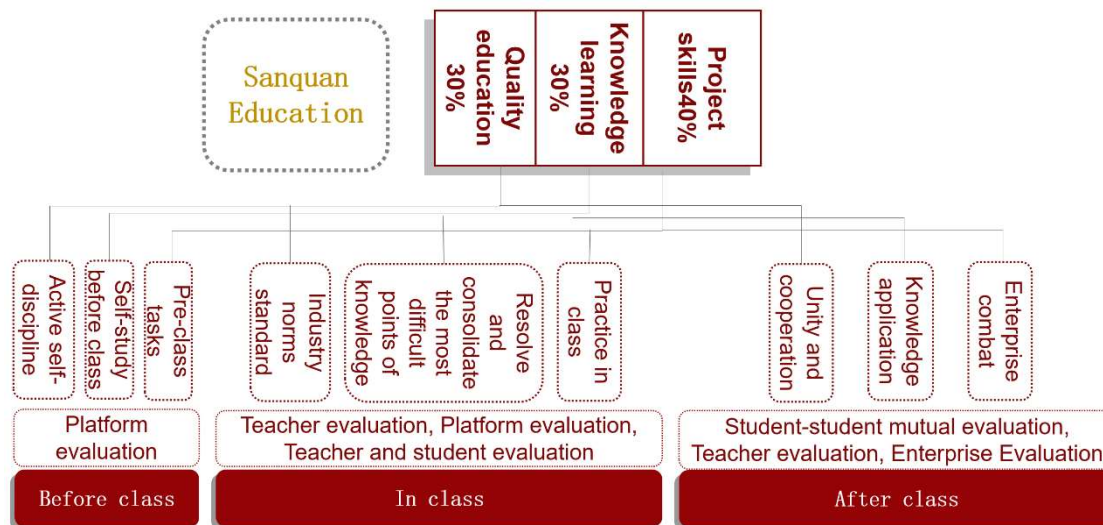


Figure 3. Teaching Evaluation System

5. Teaching Reform Effect

5.1. Student Satisfaction

After investigation, students expressed their recognition of the teaching mode. Most of the students believe that through the training of architectural drawing reading and CAD drawing speed, the concentration and professional interest of students have been improved; Improved their mastery of skills and effectively improved their self-confidence in employment. 95.24% said that they are interested in online classrooms, 50.21% of students said that the effect of online classroom learning is similar to classroom teaching, 60% of students said that they have fully achieved the expected learning goals of the course, and 23% of students said that they have basically achieved the expected learning goals.

5.2. Increase Certificate Pass Rate

In terms of the pass rate of vocational qualification certificates, the pass rate of students' architectural drawing elementary qualification examination reached 100%. Students participated in the vocational skill competition of architectural drawing and the project of architectural design graphic reading. They performed well. They were able to complete the competition earnestly and won the provincial third prize.

All students majoring in construction engineering in higher vocational colleges can participate in the professional qualification examination of architectural drawing during the school. Although the current certificate is not a necessary condition for students to work, the training of the certificate does help students consolidate professional knowledge and improve professional ability. In order to help students master basic professional skills and pass professional and technical qualification examinations, architectural design majors should add four courses in the curriculum system, including architectural structure, building materials, building structure and building construction drawings, to the curriculum reconstruction design that integrates with the certificate, and at the same time In order to facilitate students to apply for the exam, the teaching process should be arranged in accordance with the examination time, and the teaching of related courses should be arranged in semesters to ensure that students can successfully participate in the junior and intermediate draftsman exams after completing their sophomore studies.

5.3. Improvement of Teaching Effect

Through this curriculum reform, teachers are more proactive in teaching reform practice, and the use of various curriculum reform models to innovate has been promoted, and the use of various forms of teaching methods can more promote the enthusiasm of students in learning.

Table 1. Comparison table of teaching effect improvement

Years	Grade	Number	Instructional design	Informatization	Teaching effect
2019	All freshmen of Grade 19 in the Department of Architectural Engineering	450	Mainly taught by teachers	/	Students are not motivated enough in learning, and the classroom atmosphere is not warm enough.
2020	All freshmen of Grade 20 in the Department of Architectural Engineering	360	Student-centered Teacher-led Flipped classroom	Fanya Platform	Students are active in learning, and their enthusiasm for learning is high, but the learning data collection is not timely.
2021	All freshmen of Grade 21 in the Department of Architectural Engineering	400	Online and offline mixed teaching mode	Chinese University MOOC Platform	Students are very active in learning, group mutual aid learning has improved significantly, and students have a strong interest in learning.

6. Conclusion

Combining the opportunities for the construction of the intelligent construction professional group of colleges and departments, keeping up with the current innovation and reform of the construction industry, aiming at training practical architectural draftsmen, continuously analyzing the psychology of the teaching audience, exploring teaching methods, and improving the level of the teacher team, so as to ensure the quality of teaching. Provide some ideas and suggestions for the construction of architectural design majors and curriculum teaching reform in the new era.

The four-in-one training model of "Post, Cours, Certificate, Competition" penetrates professional quality education and comprehensively improves the quality of students in the process of introducing corporate positions, restructuring course content, docking vocational certificates, and actively participating in professional skills competitions. The class adopts the form of group cooperation to effectively take into account the differences between students and promote the smooth completion of teaching tasks. At the same time, it gives full play to the main role of students and strengthens student skills. At the same time, students' job abilities and professional awareness are significantly enhanced, which lays a foundation for the subsequent improvement of students' professional abilities. A solid foundation. This model fully integrates job knowledge and skill requirements, and organically integrates theoretical teaching with internal and external training teaching, curriculum teaching, and vocational qualification examination to achieve the expected reform effect. It is also meaningful for the development of other subjects.

Acknowledgments

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