

# Research on Teaching Situation and Reform Ideas of AutoCAD Course for Environmental Design Major

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## **Abstract:**

“AutoCAD” is a highly versatile course, which is the core course of environmental design major in the field of art design in Colleges and universities. It plays an important role in connecting the internal courses of the major, and it is also the main software tool to improve students' application ability. However, this course needs continuous improvement in the cultivation of talents in colleges and universities that mainly cultivate application-oriented talents. There are still some problems in the daily teaching process and teaching effect. There is a certain degree of reform demands to improve teaching and improve the quality of education. Based on the teaching process of teachers, the learning results of students and the feedback from employers, this paper analyzes and demonstrates the practical problems existing in the teaching of AutoCAD course in Application-oriented Colleges and universities, and explores and sorts out the corresponding reform ideas and measures according to the characteristics of the course.

## **Keywords:**

AutoCAD, Teaching Reform, Project Teaching

## **1. Introduction**

“AutoCAD” course is an important practical operation course for environmental design major. It is a necessary software technical condition for students to apply design theory to design conception and make construction drawings of design scheme. It is also an important performance tool for completing design scheme. Students' mastery and application ability of the AutoCAD course is not only related to the depth of students' professional learning, but also related to their employability.

## **2. Problems in the Teaching of AutoCAD**

As a computer-aided design course, AutoCAD course is not too difficult from the simple teaching level. Teachers' explanation and teaching are not difficult to organize knowledge logic and explain solutions. Students' learning is also relatively simple and easy to understand, and the specific operation is also easy to start. It is precisely

because of this relatively direct and easy to understand curriculum characteristics that lead teachers to relax the importance of the curriculum and the in-depth excavation of the teaching process, and make students very easy to meet the knowledge and operational skills learned, so as to relax the enthusiasm of in-depth learning of the course. Combined with the employer's opinions, it is not difficult to see that there are still some problems in the teaching of the specific "AutoCAD" course in the major of environmental design. Based on the teacher's specific teaching experience, practical experience and company feedback, the specific problems will be analyzed from the following four aspects.

### ***2.1. The CAD Course Has Too Little Contact with the Previous and Subsequent Courses***

As a software course, AutoCAD is a tool to solve practical problems. It serves many majors, such as machinery, construction, aerospace, clothing, environmental design, etc. When applying CAD, different majors not only need to be guided by the theoretical knowledge of the major, but also be combined with specific drawing specifications. At the same time, with the popularization of artificial intelligence, the intelligent operation and application of software have also attracted wide attention [1]. Therefore, the teaching of the course is not independent. At the same time, the nature of software tools of the course also determines the multi-dimensional connection with the professional knowledge.

The two courses of "Architectural Interior Drawing" and "Auto CAD" are currently taught separately in environmental design majors in most colleges [2]. The specific arrangement is mostly in accordance with the traditional teaching habits. The teaching of architectural interior drawing course is carried out first, and the students in the practice link use manual drawing. Students are arranged to learn the "Auto CAD" software after all the contents of architectural interior drawing are finished. This is a simple teaching form according to the basic position of the course. The two courses, which are closely related to each other, are studied in two different semesters. The incoherent teaching methods and the differences in drawing habits between manual drawing and software drawing lead to the isolation of the course, which cannot be well complementary to each other and fully integrate the knowledge system.

### ***2.2. The Allocation of Theoretical and Practical Class Hours is Not Scientific, and the Teaching Content is Out of Line with the Market Demand***

In the teaching of theoretical courses, the teacher is the leader to tell the course theory step by step according to the progressive and in-depth degree. Combined with practical cases, the theoretical knowledge is brought into the practice link. Starting from the knowledge demand involved in the theoretical support, the interpretation of the relevant discipline knowledge is integrated. The teaching of practical courses is based on students through the analysis, discussion and training of practical projects, to summarize knowledge, and to obtain solutions to problems, to form a certain methodology to guide specific practical operation. In practice teaching, adhere to the student's dominant position, and knowledge can be transformed into individual application skills through specific practice process. Therefore, the class hours used in practical teaching should occupy most of the teaching hours. However, in most colleges and universities, due to the low overall cultural score of art students, In consideration of the actual situation of the students, the instructor tends to allocate a larger proportion of the theoretical lecture time and less allocated practical time.

Teachers pay more attention to the acceptance of knowledge and the actual acceptance of students, which weakens the cultivation of autonomous learning behavior. More emphasis is placed on how much students have learned, rather than on how much they have applied. As a result, students' ability to understand, comprehend and transform knowledge is weak, and their ability to draw inferences from one instance is poor [3].

At the same time, in the combination of curriculum teaching practice and market demand for talents, many schools lack of in-depth investigation on the actual demand of market talents in the formulation of talent training programs, and there are unreasonable places in the allocation of specific class hours. And the specific teaching process is lack of class hours for students to carry out learning activities, and the time allocation for students to carry out knowledge application transformation and participate in case practice is also obviously insufficient.

### ***2.3. The Knowledge of Architectural Drawing Mastered by Students is Not Systematic and Complete, and They Ignore the Requirements of Construction Drawing Specifications***

Because the courses of architectural interior drawing and AutoCAD are taught by different teachers in different semesters, the related theories of architectural drawing cannot be effectively combined with AutoCAD software in time. When it comes to the specific computer practice of students, it is very easy to ignore the relevance of knowledge, cannot effectively combine with the knowledge of manual drawing, ignore the application of the basic theory and basic regulations of architectural drawing, students usually practice single command of software in case practice, It is easy to put the practice energy into the use of orders, while ignoring the preciseness and accuracy of drawing specifications, resulting in the lack of specifications of the drawings [4], which cannot be directly used as the basis for construction. This kind of software learning ignores the requirements of drawing specifications, which directly leads to the poor effect of foundation preparation for other professional courses.

### ***2.4. The shortcut key of AutoCAD Can Not be Fully Memorized and the Drawing Speed is Too Slow***

There are a lot of commands provided by AutoCAD software. In order to improve the drawing speed, you must use the right and left hands together, and use the shortcut key effectively at all times when drawing. However, in the current "AutoCAD" course teaching, students' overall learning is still at a relatively shallow stage. When they start to learn and draw simple graphics, they cannot feel the shortcut and convenience brought by shortcut keys, and they do not have the consciousness of using shortcut keys. Although there are many commands provided by AutoCAD, the commonly used commands only account for about one tenth in the specific daily drawing tasks. If you can't master the shortcut keys well, students will not realize the advantages of using shortcut keys. When dealing with more and more complex design drawings, they can't quickly draw the design scheme drawings in the shortest time, which can't reflect AutoCAD The efficiency of software drawing, at the same time, due to the lack of flexible use of software shortcut keys, the learning of software mostly stays at the level of skill learning, and cannot break through to the level of learning and exploring skills.

## **3. Ideas and Measures of Teaching Reform of AutoCAD**

“AutoCAD” course is set up in the second year of environmental design students, and plays a key role in the whole professional course learning. Students transition from the study of professional basic courses to the study of professional courses, from the hand-painted stage of scheme performance to the link of computer software expression. The course of AutoCAD plays an important role in this process. How to combine with the professional theoretical knowledge in the early stage, How to deepen the theoretical knowledge and effectively apply it in the specific practical operation; how to reasonably plan and allocate the class hour proportion of theory and practice; how to fully implement the drawing standard knowledge in the process of software drawing; how to combine the teaching and learning process of the course with the dynamic development of the market to the greatest extent, so as to effectively improve the learning effect of the course On the basis of solid theory and skills, we can master more operation skills of software, and improve the application value of software in specific operation. In view of the existing problems and the purpose of the course, we can carry out the specific curriculum teaching reform through the following measures.

### ***3.1. Strengthen the Connection Between AutoCAD and the Teaching of Architectural Drawing and Other Courses***

In the environmental design specialty, the relationship between AutoCAD and architectural drawing and 3dsmax courses is very close. The knowledge of architectural drawing course is the basis of what to do with AutoCAD software and what standard requirements to do. Conversely, the strength of AutoCAD software is the means to accurately express the design scheme in Colleges and universities. At the same time, as a two-dimensional expression tool for expressing design scheme in environmental design specialty, AutoCAD is complementary to 3dsmax, which is used to draw construction drawings by AutoCAD, and scheme effect drawings by 3dsmax. AutoCAD is a two-dimensional plane and 3dsmax is a three-dimensional space [5]. As software developed by the same company, AutoCAD and 3dsmax have a lot of similarities in the use of the same type of shortcut keys and specific operation methods. Therefore, the relationship between the three courses is extremely close, whether it is the previous architectural drawing or the follow-up 3dsmax.

At present, many colleges and universities separately teach the three courses of “Auto CAD”, “Architectural Drawing” and “3dsMax”. This kind of teaching mode can easily separate architectural drawing and AutoCAD drawing into two courses with different theoretical systems. Therefore, in terms of the curriculum system of the whole environmental design specialty, we should reform the teaching mode, effectively connect the role of architectural drawing course on the course of AutoCAD, strengthen the basic role of architectural drawing course, and improve the learning effect of AutoCAD course; lay the two-dimensional paving significance of AutoCAD software, and do a good job of “starting” the “3dsmax” course It can effectively realize the effective connection and integration between AutoCAD course and the prelude “architectural drawing” and subsequent “3ds Max” course, and form a coherent teaching system.

### ***3.2. Strengthen the Connection with the Market by Incorporating the “Project-Based” Background in the Teaching Model***

AutoCAD is a highly practical course. Starting from the characteristics of the course, taking students as the main body, taking practical application as the guidance,

and taking the actual market demand as the guide, the specific teaching organization should take the practice process as the carrier, reasonably match the class hour allocation of practical courses and theoretical knowledge, and effectively integrate theory and practice. Teachers organize students to carry out specific exercises in a planned way, and integrate all kinds of requirements and norms of the actual project in the specific post work process, and carry out the specific teaching process in the way closest to the market post demand.

In order to solve the problem that the theory and practice of AutoCAD course are not balanced and the market demand is out of line, the most effective way of reform is to solve the problem of students' weak practical ability and disjointed with market demand in the specific teaching process. In the course of architectural drawing and AutoCAD, the representative real cases are selected according to the characteristics of the course, such as choosing a house type with three bedrooms and two living rooms, or a living room or even a bedroom in a set of house types as a practical project, and then carry out decomposition teaching around the selected case project. In the teaching process, it is based on AutoCAD software, striving for the teaching mode with the background of "project" to carry out the specific teaching process. "Project" also known as "real problem" teaching, can better abandon the defects of virtual case teaching, can also be a good test of the real effect of students' learning. While training students' professional skills, we should also constantly cultivate students' ability of sustainable development. The post teaching mode with "project" as the background, its curriculum is designed to break the traditional teaching system and construct the curriculum teaching structure oriented by the actual demand. Based on the original knowledge of the course, the knowledge can be layered according to the actual project design process of the market. Under the condition of the total amount of theoretical knowledge unchanged, the practical operation skill knowledge of the project can be integrated to increase the actual combat of students Ability, in the process of understanding and applying knowledge, let students know what the course learning is doing and what is the value of doing [6].

### ***3.3. Pay Attention to Strengthening Students' Initiative and Creativity***

The updating of computer technology is very fast, and AutoCAD software is also constantly updated. We should not only pay attention to the theoretical explanation in classroom teaching, but also pay attention to the methods and essentials of students' learning and mastering software, improve students' self-learning ability, strengthen students' self-learning consciousness [7], and enable students to master the ability of using basic knowledge as logic to carry out update learning power.

The command line of AutoCAD software is not only the area of command input, but also the place of next operation prompt. In the process of explanation, the teacher should not only explain the operation process of the command, but also analyze the principle of each step to remind students to observe the prompts in the command prompt area, and then carry out accurate operation [8]; in addition, in AutoCAD software, almost every common command has its corresponding shortcut key which can complete the operation through one to three letters, and the teacher explains the shortcut of the corresponding command In order to improve the drawing speed, students are required to carry out practical operation training through shortcut keys, so that students can initially understand the reasons and advantages of using shortcut keys. In addition, teachers should also transfer the application methods and skills of corresponding commands in the drawing process, and encourage students to use the

drawing method of similar cases to learn research software, so as to enhance students' awareness of autonomous learning and exploratory learning. Through this method of teaching reform, students can quickly master the use of software skills, rapid use of AutoCAD software to complete the construction drawing, and can adapt to the software update and replacement naturally and smoothly [9].

### ***3.4. Improve Teaching Methods to Better Achieve the Purpose of Training Applied Talents***

At present, art colleges in many application-oriented universities are trying to explore the training path of applied talents of "commercial art" in combination with the development orientation of the school. In the specific teaching, effectively transform the works into commodities, so that the classroom is closer to the market. In order to achieve the transformation from works to commodities, it is obviously not enough to follow the conventional teaching methods by referring to and imitating the traditional teaching mode of other colleges and universities. We should not only jump out of the traditional teaching mode, but also constantly reform and try new teaching methods, so as to improve students' participation and enthusiasm through the form of flipped classroom [10]. AutoCAD is the drawing software that environmental design students must master. In the teaching process, it always emphasizes that the idea and method of software learning are equally important. How to design classroom teaching, and in the specific teaching process, it puts forward the conversion problem of "homework work commodity", which requires students to think, discuss and analyze. Through the specific process of putting forward problems, analyzing problems and solving problems, we can improve the ability of students to find, analyze and solve problems independently, and let students master the ability of analysis, summary and reflection, so as to deal with various professional and technical problems in the drawing of specific working drawings.

At the same time, it is difficult to mobilize students' interest and enthusiasm in the process of teacher led indoctrination teaching. In the process of exploring new teaching methods, we should always take students as the main body in teaching design. For example, in the application of "project" real problem case teaching, after the teacher determines the project and issues the task book, it is necessary to carefully design the process of the project progress, so that students can learn from the preliminary scheme The preparation and reference of materials, the finalization of the draft, and then the presentation and evaluation of software performance and scheme, students actively participate in the whole process, fully mobilize students' autonomous learning ability and subjective initiative, shorten the distance between teaching and market demand, and meet the needs of commercial social environment design talent training.

## **4. Conclusions**

"AutoCAD" course teaching is an important part of practical teaching. Therefore, we must not only to solve the existing problems, change the original teaching ideas, reform the inherent teaching mode, teaching process, teaching forms and teaching methods of bold reform and innovation, but also make it clear that teachers only play a guiding and promoting role in the entire teaching process, students are the main body of learning activities. Therefore, we should pay attention to give full play to the students' initiative and creativity, strengthen the connection between the internal theory and software courses of environmental design specialty, and adjust the

proportion of class hours in the practice training of the course. In a real sense, it can shorten the distance between teaching and market, strengthen students' professional ability, effectively improve students' application skills and comprehensive quality, and achieve the goal of training applied talents.

## Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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