Research on the teaching reform of computer aided design

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Abstract. In view of the specific features and requirements of the computer aided design course and the practical problems, the reform and exploration are carried out from the aspects of course content, teaching methods and means, in order to improve the students' interest in the computer aided design course and improve the students' ability to solve the problem.

1. Introduction
With the rapid development of computer technology, computer aided design technology, CAD technology, is widely used in practical engineering design. It has become the first choice tool for design and analysis of products in related fields, such as machinery, electronics, architecture, aviation, aerospace, automobile, chemical industry and so on. Field. The contents and directions of CAD courses in different specialties and schools are also different. For example, AutoCAD is a relatively wide application course. For the junior students of mechanical major, the basic application of AutoCAD software has already been mastered in the learning of mechanical drawing course. The teaching of this course is mainly aimed at the two development of AutoCAD software after mastering the basic application of AutoCAD software. It involves UG, Pro/E, CATIA and other software. To enable students to understand CAD technology and master the two development technology of CAD software. In the course of teaching, teachers can stimulate students' interest in learning through the reform of teaching content and teaching methods, mobilize the students' subjective initiative, strengthen the students' practical ability, and thus improve the quality of teaching.

2. The importance of computer aided design teaching
Computer aided design (Computer Aided Design) (Computer Aided Design) (Computer) aided design, the narrow sense refers to the use of computer and its graphics equipment to help designers to design work, referred to as CAD [1]. In the broad sense, it refers to a kind of auxiliary design, which uses the computer as the medium, instead of the brush, to express the design content and make it more vivid and comprehensive.

Today, computer aided design teaching has been popularized in all fields of art design and occupies a more important position. Its continuous rapid development can prove the important role of computer aided design in art design. Up to now, the computer aided design courses for art design major in universities are increasingly diversified, including the Photoshop, Dreamwear, Flash, etc. of the Adobe company, such as Autodesk, 3ds, MAX, MAYA and so on. With this kind of computer aided design software, the design effect of the designer can be more and more effective [2-3]. The more comprehensive the needs of customers are met. According to the needs of the long-term development of art and design, teachers need to guide students to realize clearly in the process of designing education
that the soul of the design is the consciousness of innovation and thinking, and the computer aided design
directly determines the practical effect of the design into production practice, which is an important
means to realize the design [4-5].

3. System thinking and method in Computer Aided Design Teaching
The core of system thinking is the relationships, relationships and interactions among all parts of the
system, that is, the structure, relationship and interaction of the whole object. Compared with the
traditional way of thinking, system thinking is changing from single to multiple.

In the teaching of computer aided design, systematic thinking and method are the important
foundations to guide students to understand and apply design methods and design scientifically and
completely. It includes the analysis and synthesis of design objects, the transmission, control and
feedback of design information.

3.1. Communication, analysis and synthesis of design information
It is the basic content of art design teaching to obtain the basic information of design sources, design
elements, design methods and so on, and the basic content of art design teaching [6]. Only by making
the students master the steps and methods of the process, can we design the design object in the future.
There is a great development on the road. Therefore, in the computer aided teaching, it is necessary to
apply the modern technology to the analysis and synthesis of the design, and integrate the data analysis,
the customer analysis and the design sample test in the case analysis, and train the students' system
analysis and the comprehensive thinking and methods from the basic teaching link.

3.2. Control the effective information in the design process
In today's information age, we need to integrate fragmented information into available technological
resources to support the development of innovative design. Therefore, in computer aided design teaching,
students need to develop the habit of information sensitive, and can process and deal with effective
information in time so as to meet the technical and emotional demands of the design activities [7]. In
design activities, effective information is controlled mainly through front-end resource accumulation,
middle end object analysis and terminal comprehensive integration. The implementation of these steps
to computer aided design teaching is mainly embodied in the practice of training students to establish
electronic material library, select design materials from the material base, extract material from the
design requirements to material (element extraction), and grasp the essence of the demand for the
original design.

3.3. Pay attention to design feedback
Design process is a practical process in computer aided design teaching. At the same time, design
feedback is also a teaching content that needs to be paid attention to in computer aided design teaching.
The main role of design feedback is to improve the market demand and user experience needs missed
in the design process. After redesigning, the effectiveness of feedback information is maximized.
Effectively using the design feedback and perfect design, we can analyze the information of customer
and market feedback through advanced technology such as CRM customer management system to form
a new source of information in the same customer group or market area, so as to form a complete setting
system for a virtuous cycle.

4. The updating and arrangement of teaching content
With the rapid development of computer technology, knowledge update cycle is shortened. In order to
make the students master the latest CAD technology as much as possible, they have deleted some
relatively old content, added or updated part of the content to keep up with the pace of the development
of the times. The latest version of the two development of AutoCAD software as a classroom teaching
content, update the latest software development knowledge, so that students through the two
development of AutoCAD software to improve the efficiency of drawing and reduce the workload.
Teachers should systematically describe the content of CAD interface technology, graphic standard and software engineering technology, so that students can master the CAD interface technology and graphics standards, understand the basic concepts of software engineering, master the development process of CAD application software and the standard of document compilation of CAD software, and improve the software development technology.

In view of the specialty of the machinery, a powerful computer aided design software, such as UG, Pro/E, CA-TIA, ANSYS, and ADAMS, which is often used in the mechanical specialty, is introduced and applied to guide the students to use the help documents of the software to learn all kinds of CAD software.

In practice teaching, the development of AutoCAD can be used to make students master the most basic development function of AutoCAD, to learn the auxiliary design program in C language, to define the drop-down menu, and to master the AutoLISP language has a more intuitive understanding of the course of computer aided design.

5. Reform of teaching process and mode

5.1. Elicitation teaching
The heuristic teaching is based on the situation teaching theory, creating a situation related to the original knowledge system of the students, and attracting the students to arouse the students' interest in learning. Combining the characteristics of the mechanical specialty and the students, set up the problems related to the mechanical design drawing, so that the students can use the AutoLISP language flexibly to develop the AutoCAD software and improve the drawing efficiency.

Teaching students in accordance with their aptitude, heuristic teaching can stimulate students' interest in learning. According to the individual differences, the media technology can be used to create an ideal personalized teaching environment, such as "professional CAD software and AutoCAD" software leads to the discussion and summary of the problem of "professional software development". In addition, it can strengthen the practice link of the students and apply the knowledge and skills learned in the classroom to practice.

5.2. Case teaching
The selection of cases is the key to the success of the case teaching method. The case should be integrated with the teaching content, and should be combined with the professional characteristics, while paying attention to the practicality, representativeness and interest of the case. The introduction of basic concepts and knowledge At the same time, we choose an example of engineering design as a teaching case, analyze and study it, and get the method and ability to analyze and solve the problem through the students' independent thinking and discussion, so as to cultivate the students' ability to use knowledge in a comprehensive way and strengthen the teaching effect. The decomposition and processing of the case must pay attention to the characteristics of gradual progress. At the beginning, the content span should not be too large to avoid the difficulty of the students in the moment, and the latter should be gradually expanded to meet the requirements of the coverage and depth of the knowledge point.

After teaching examples, the students operate in accordance with the requirements, so that the computer operation is integrated into the design, and it has a good guiding significance for the future study and work. Teachers can collect the homework completed by the students through a series of software, the collection of homework not only can be used as a student's normal performance, the teacher can also be summed up and summarized according to the students' feedback of the learning situation, and accumulate more experience for the later teaching. In conclusion, careful design examples enable students to turn from typical imitation to autonomous learning, so that teachers can organize teaching content in a simple way.
5.3. "Task driven" Teaching
"Task driven" teaching refers to the selection of the design drawings of related projects as a large experiment to enable students to learn with tasks and purposes. This is a good way to drive learning. We should try to be "sophisticated" and "full" in experiment assignments, and students will be more likely to arouse interest in learning with problems. In the experiment, the teacher's instructive "fine talk" is required, the students' repetitive "more practice", the first evidence of the theory to master the methods and skills, and then give full play to the creative ability.

5.4. Modern means of teaching
Modern teaching generally combines classroom teaching with practice teaching. The teaching of basic knowledge is understood and accepted by the form of multimedia courseware, and the clear electronic courseware is also convenient for teachers to explain and increase the information capacity. The experiment class went to the computer room to do related computer operation, and practice software programming and software operation.

(1) Because of the large amount of information in the professional CAD course and the many contents that need to be recorded, the traditional teaching methods have not adapted to the characteristics of the education information, and we should use modern teaching methods to teach. The main features are as follows: first, the explanation of some theories is more thorough, and the students can be demonstrated and explained in the classroom; two is to analyse and comment on the students' problems in the process of software use; the three is to explain the use of software directly to the students. In the course of teaching, modern teaching effectively develops and organizes various learning resources, breaks the single form of the teaching materials, and develops multimedia courseware with various forms of expression, such as words, images, numbers, sounds or various forms, so that the content of teaching is structured, intuit ionized, visualized, and information. It provides students with rich teaching information and diversified information expression, which is convenient for teachers to teach or students to learn independently.

(2) The teaching of CAD course should focus on practical links and strengthen experimental guidance, so as to ensure the successful completion of graduation design. In order to guide the experiment of the course, we should strengthen the experiment management, ensure that everyone can do it and stop plagiarism. Besides the practice instruction in the experiment course, we should provide experimental teaching courseware with experimental steps and operation methods to assist the teaching and guide the experiment, and help guide the students' extracurricular exercises.

(3) It is a new way to integrate theory teaching with practice teaching. Combining the theoretical teaching design experiment with the use case, we should pay attention to the skills and skills of the two development of AutoCAD software, decompose the key and difficult points of the experiment, cultivate the interest and ability of learning, and strive to improve the teaching effect and quality.

6. Perfection of assessment and evaluation system
The selection of examination methods and content has a strong promotion and guidance for the source of students' learning. It is necessary to abandon the traditional examination method of final closing examination and adopt a variety of flexible assessment methods. For example, the students' grades can be made up of the following parts: 10% in class attendance and large homework; 40% on the machine and 50% at the end of the semester, thus promoting the students' ability to improve the practical ability and to solve the practical problems of the engineering.

7. Conclusion
Using "case" to increase perceptual knowledge, to use "task" to organize teaching practice, to apply modern teaching means, to improve multimedia courseware and to improve students' enthusiasm for learning to the greatest extent. Students should be proficient in the routine functions and characteristics of the software and apply the environment to the application of the knowledge and skills learned in the classroom to the actual needs. Modern teaching can enable students to flexibly apply the Auto LISP
language to the two development of AutoCAD software, improve the efficiency of drawing, train their awareness of engineering, and provide hands-on ability.

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