

Exploring the Application of Modern Educational Tools in Teaching Mechanical Drawing

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Abstract: Mechanical drawing, as an important basic course in higher vocational and technical institutions, mainly teaches student the ability to read and draw mechanical part. In the teaching process of mechanical drawing, the traditional means of wall chart, board book and model can no longer stimulate students' interest in learning. With the deepening of the teaching reform, teachers should begin to accept new teaching concepts and learn more modern and advanced means, so the use of modern educational tools for teaching mechanical drawing can not only save school hours, but also strengthen the cultivation of students' spatial imagination, and also enable students to have a more comprehensive understanding of the professional drawing software. This article briefly describes the teaching status of mechanical drawing, proposes the application and practice of modern educational tools, and finally lists some examples of modern educational tools integrated into the teaching of mechanical drawing, hoping that through the teaching reform of mechanical drawing, the course can better serve the needs of the profession.

Keywords: Mechanical drawing; Modern educational tools; Teaching

1. Brief description the teaching of Mechanical drawing

Mechanical drawing is a compulsory basic course for science and engineering students to serve, is the basis for students to study subsequent professional courses, it plays an vital important in helping students develop spatial imagination skills, it is a highly theoretical and practical course. Knowledge of mechanical drawing is a stepping stone to success for the future industry for science and technology, especially for mechanical students. Nowadays, factories and other employers require graduates to be able to read and understand not only mechanical drawings, but also to have the ability to draw. Therefore, how to improve the quality of mechanical drawing teaching, to ensure that student master drafting skills, is the focus of the current research on the reform of mechanical drawing, and the training of students' drawing ability must be given sufficient attention.

However, because the course is not much related to the curriculum learned in junior and senior high school, so students can basically be treated as zero foundation, so on the other hand, because the teaching content students have not been exposed to, in the same starting line, which helps teaching uniform progress; otherwise, because there is no foundation, students generally reflect that the course is difficult to learn, it is difficult to imagine the spatial structure, repeated explanation reduces the teaching quality and teaching effect.

With the rapid development of intelligent, modern technology, the application of modern teaching methods to improve the quality of classroom teaching has become the way of today's society. For the new students who first contact with mechanical courses, they have a strong interest in learning the new course content, compared with the traditional boring education mode, they prefer the teacher to present the content in a variety of modern information means, combined with a large number of animation and other forms to enrich the teaching content.

2. The application and practice of modern educational tools in the teaching of mechanical drawing

2.1 Use of multimedia courseware

The use of multimedia teaching is one of the most commonly used teaching tools in modern times, mainly by borrowing

powerpoint to supplement teaching, improve the traditional board book type mathematics, the previous mechanical drawing classroom can only use the board book drawing or wall chart display method, a lesson usually can only draw one or two parts, encounter complex parts, have to erase one before you have a place to draw the other, some teacher do not have solid personal basic skills, not only slow and not standardized, so the classroom efficiency is low, the teaching effect is not good. So with multimedia courseware, teachers can demonstrate the projection diagramming steps in detail to students in class, and match different lines with different colors, so that a lesson can show more than graph drawing steps. The dynamic effect of powerpoint display not only increases the intuitiveness and clarity, but also makes the teaching atmosphere become active, so that students' interest in learning becomes increasingly strong.

2.2 Application of AutoCad two-dimensional drawing software

The first lesson of mechanical drawing is usually devoted to the basic rules of drawing, introducing the basic concepts of national standards and the requirements of drawing lines and writing text, reflects the high demand for accuracy in mechanical drawing, manual drawing always have large errors, and the advantages of AutoCad are unmatched by manual drawing. AutoCad is a feature-rich drawing software, which carries powerful drawing aids, and can draw and edit basic planar graphics, and can dimension, add text, etc. And there are layer management functions, you can place the graphics in different layers, with color, line type, line width to distinguish, and can also carry out three-dimensional drawing. Because it is easy to operate and easy to modify, many industries and companies use AutoCad as their basic design software today. In the traditional teaching of mechanical drawing, manual drawing is a time-consuming task, for example, the line width, line type, font, and labeling of standard drawings are all national standards, and it is difficult to precisely control the accuracy through manual drawing, but these contents are set in AutoCad software, and we can choose the desired specifications according to the drawing width, which greatly improves the drawing efficiency. The drawing of relatively complex geometric planes, such as polylines, ellipses, etc., can be complicated and time-consuming, but in AutoCad software it can be achieved by a simple drawing command, which greatly improves the drawing efficiency and allows students to experience the fun of modern teaching. Many schools have made AutoCad a stand-alone course, but it is taught using the knowledge acquired in mechanical drawing courses, and combined with computer-aided design and drawing, in terms of content and mechanical drawing is overlapping, it can be said that mechanical drawing is the basis of AutoCad drawing software drawing, and AutoCad software drawing is the support of mechanical drawing, the two complement each other and should not allow to be divided. The course name can be changed to "Mechanical Drawing and AutoCad", and then the syllabus, teaching program and teaching plan will be adjusted and optimized, and the specific contents will be arranged.

2.3 Applications of SolidWorks 3D drawing software

SolidWorks 3D drawing software is a popular and practical 3D software, can be used for parts design, can be all-round, full perspective display parts structure, and can be perspective, section view, also can let students more intuitive feeling parts structure, make up for the lack of spatial imagination, and gradually build up the spatial logic ability. In teaching, the sectional view is a difficult point for both teachers and students to deal with, and it is difficult for teachers to give students a clear understanding of the internal structure of the geometry, SolidWorks can cut the geometry in different planes and show the shape of the section visually, so that students can understand the section better. Reduces the difficulty of teaching and learning for teachers and students, saving a lot of time.

Scientific teaching plays an important role in teaching tasks, which can not only complete teaching tasks with more efficiently and with higher quality, but also can make students more and more interested in learning, SolidWorks plays such a key role in the teaching of mechanical drawing, and when it comes to obscure and difficult aspects such as section view, intersecting body and so on, the intuitive teaching means of 3D view greatly reduces the teaching difficulty of teachers and the learning difficulty of students, and to a certain extent mobilizes students' enthusiasm for learning this subject, increases students' interest in learning, and gradually cultivate and improve students' spatial imagination.

3. Examples of modern educational methods integrated into the teaching of mechanical drawing

(1) One of the major teaching difficulties in the process of mechanical drawing is the learning of line of section and line of intersection. Through the teachers' teaching experience and the analysis of the students' learning performance in the past, it can be found that most of the students do not have enough mastery of this knowledge when learning the line of section and line of intersection. Teachers can use SolidWorks, to build the basic model and mark the line of section and line of intersection, so that

students can make a clear and visual observation to better understand and master the line of section and line of intersection. Teachers can compare the different dimensional views in the software with the constructed 3D models to strengthen students' impressions. At the same time, teachers can use the geometry of AutoCad software to guide students to analyze and try to solve the line of section and line of intersection. The teacher can deepen students' memory of this knowledge through a lot of practical exercises and make them flexible to use the line of section and line of intersection solution method.

(2) In the process of teaching the sectional view, teachers can use the cutaway view to guide students to a detailed understanding of the internal parts diagram, the role played by different parts through the sectional view, and the characteristics of the role of different parts in different structures. In order to raise students' memory, teachers can introduce the cutaway view to students in detail through AutoCad drawn drawings. Firstly, the teacher can use SolidWorks to construct a virtual model of the internal parts, then demonstrate the effect of sectioning on this model, convert the 3D model into 2D drawings, and guide the students to observe the sectioned drawings, so that they can grasp the changes in the model after sectioning, the structure of the parts, and then enable them to complete independently the cutaway view.

4. Conclusions

With the continuous development of modern technology level and the progress of human thought, scientific advanced and reasonable teaching methods and teaching modes are crucial in teaching work, which require teachers of relevant courses to continuously study and practice, and more importantly, to learn more about the most cutting-edge technology of modern science and technology and timely integrate them into classroom teaching, promote teaching effectiveness.

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