

Instructional design of "Web Development Technology" course based on BOPPPS model

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Abstract

This paper analyzes the characteristics of "Web Development Technology" course and elaborates the connotation of BOPPPS teaching model. Taking "CSS Positioning" as an example, the article tries to practice "student-centered" classroom teaching design based on the six elements of the BOPPPS model, and follows the principles of initiative and goal orientation to reasonably build a complete classroom structure. We discuss the application of this model in the course of "Web Development Technology" by following the principles of initiative and goal orientation and constructing a reasonable and complete classroom structure. The teaching practice proves that the BOPPPS model can enhance students' participation and engagement, cultivate students' spirit of cooperation and inquiry, and effectively improve the classroom teaching effect of "Web Development Technology".

Keywords

BOPPPS model; CSS Positioning; Instructional Design; Web Development Technology.

1. INTRODUCTION

"Web Development Technology" is a professional compulsory course for students majoring in artificial intelligence, including web page layout and beautification, the implementation of dynamic special effects of web pages, and Python web project development (Django framework). "Web Development Technology" is a highly practical course, involving a wide range of knowledge points and a strong correlation between the preceding and following contents, which requires students to devote themselves to learning, to be able to develop a simple enterprise-level project, and to cultivate students' practical skills and innovative ability.

At the present stage, the teaching process of "Web Development Technology" is based on modern teaching equipment, but the traditional teacher-centered teaching mode is still adopted, in which the teacher explains every knowledge point in the book as exhaustively as possible, while students only accept it passively and lack active participation, which completely limits the full play of students' potential. Applying the "student-centered" BOPPPS teaching model to "Web Development Technology", optimizing the teaching design and building an effective classroom with the help of the "Learning Platform". It is imperative to do so.

2. BOPPPS TEACHING MODEL

The BOPPPS model was created in 1976 by the Douglas Kerr team at the University of Vancouver and has been implemented in more than 100 universities and institutions worldwide

[1]. It can help teachers decompose and analyze the teaching process, identify teaching blind spots, and improve and enhance teaching effectiveness [2]. The BOPPPS model divides the classroom teaching session into six stages, including Bring-in, Objective, Pre-assessment, Participatory Learning, Post- assessment, and Summary.

(1) The task of the Bring-in phase is to attract students' attention, arouse students' interest, and play a role in inheriting the past and the future. With certain skills, it is introduced by asking questions, talking about hot topics, playing videos, case studies, etc.

(2) Objectives are one of the key aspects of the BOPPPS teaching model, and all teaching activities should be centered on the learning objectives. The task of this stage is to make the learning objectives of the lesson clear to students and facilitate them to grasp the focus of learning, often using PPT presentation.

(3) The task of the Pre- assessment is to understand the students' mastery of the basic knowledge, so that the teacher can adjust the depth and progress of the teaching content. This can usually be done by asking questions, quizzes, brainstorming, group discussion, questionnaires, etc.

(4) Participatory learning is one of the most crucial aspects of the BOPPPS teaching model, reflecting the "student-centered" teaching idea, and the task is to let students participate in teaching and learning in many aspects to master the knowledge. It is usually conducted by means of individual reports, group discussions, practical exercises, role plays, hands-on calculations, scenario simulations, seminars and case studies.

(5) Post- assessment is used to test whether students have achieved the learning objectives and to further extend their knowledge. It is often used to assess the teaching effect by answering questions, quizzes, doing exercises, demonstrations and debriefings, and to conduct teaching reflection and diagnosis based on the assessment results and adjust the teaching design in time so as to better achieve the teaching objectives.

(6) The task of the summary section is to review and sort out what has been learned in the lesson, which is beneficial for the teacher and students to reflect on the problems. It is recommended that students be guided by the teacher through group discussions, content review, comments, and summarization.

3. INSTRUCTIONAL DESIGN BASED ON THE BOPPPS MODEL

"Positioning" is to determine the position of something in a certain environment, including the positioning of a product in the market, the positioning of a person in an organization, the positioning of an object in a certain geographical location, etc. In the classroom teaching of "Web Development Technology", "CSS Position" is one of the common techniques in webpage layout, and the positioning function of CSS language determines the position of elements in the webpage, which is the key content of the course. It is flexible and versatile.

The following is an example of the application of the BOPPPS model in the teaching process of "Web Development Technology" course. The Instructional design list of "CSS positioning" based on the BOPPPS model is shown in Table 1 [3].

Table 1. Instructional design of "CSS Positioning" based on the BOPPPS model

Teaching session	Time/min	Teacher activities	Student activities	Teaching methods
Bring-in	4	<p>Introductory question: Have you ever thought about what life will be like for you after four years of college? What are you going to do now? Introduce positioning through the standing position of performers in the stage</p> <p>Content Review: What are the methods of adjusting the position of elements that you have learned? What are the differences between it and the positioning we are learning today?</p>	Share career planning; generate interest	Showing famous quotes on career planning; free sharing
Objective	2	<p>Knowledge Objective: Understand the representation of CSS coordinate system, master the principle and syntax of CSS positioning</p> <p>Skill goal: To be able to choose the correct positioning method to achieve the positioning of elements in a reasonable coordinate system</p> <p>Emotional goals: to develop good habits of planning and positioning their lives well</p>	Watch the PPT to know the key points	PPT presentation
Pre-assessment	2	Publish test questions in "Learning Pass" to test the effectiveness of students' pre-learning	Complete online video learning before class and complete pre-test exercises on site	Interaction in Chaoxing Learning Platform
Participatory Learning	25	<p>Case Analysis: Demonstrate and analyze the key issues to be solved in the case (interaction between teachers and students)</p> <p>Knowledge explanation: To achieve positioning, you must first find the reference object, and then achieve specific positioning according to the orientation... (Randomly draw lots in "Learning Pass")</p> <p>Operation demonstration: according to the form of one question and one answer to achieve the case effect (teacher-student interaction)</p>	Practice in groups (3 persons/group); group task demonstration	Live demonstrations; Interaction in the "Learning Pass"; oral communication; hands-on practice
Post-assessment	10	Take group assignment for presentation to understand students' mastery of knowledge points	In-group discussion; Cooperation and mutual assistance; assignment presentation	Oral communication; live demonstration
Summary	2	Summarize the teaching content according to the learning objectives and the assignments presented by the students; publish the learning tasks in the Chaoxing Learning Platform	Listen carefully; refine your notes; reflect on what you have learned	Oral comments; Chaoxing Learning Platform

3.1. Bring-in

A wonderful introduction can arouse learners' interest in learning and mobilize their initiative to learn in order to meet their own needs [4]. From asking students about their aspirations for life after four years of college, students are asked to think about their future development direction according to their current study status, make personal career planning, and what efforts they should make now. Then, through the position of the performer on the stage, the importance of positioning is drawn, the interest in learning is stimulated, and the students' sense of identity with the knowledge they have learned is enhanced.

3.2. Objective

The objectives of this lesson include two aspects: first, to let students understand the representation of CSS coordinate system and master the principle and syntax of CSS positioning; second, to be able to choose the correct positioning method to achieve the positioning of elements in a reasonable coordinate system; third, to develop a good habit of planning and positioning their lives well. Requirements are given to students from three aspects: knowledge, skills and emotions, and the learning objectives progress from theory to practice layer by layer, with observable and measurable goals.

3.3. Pre-assessment

Based on the knowledge gained from the previous lectures and the content of the online video, the teacher asks questions in "Learning Pass" as a Pre-assessment: (1) What methods can be used to achieve the layout effect in the figure? (2) Select what you think is the correct coordinate system representation in the figure? (3) Based on the coordinate system in the above question, write down the correct positioning attributes. (4) What are the common positioning methods? (5) How do you achieve vertical centering of elements? Teachers can understand how students are currently learning, and students will engage seriously with the course with questions when they are not sure if their answers are correct.

3.4. Participatory Learning

In the participatory learning process, first, the teacher shows the effect of the case and discusses the key problems that need to be solved in the case. Second, to achieve positioning, we must find the correct reference object, and the teacher teaches the positioning syntax "position : static | fixed | relative | absolute"; to explain the reference object of each positioning method respectively. static is the default property of position, elements are sorted according to the normal document flow; fixed is fixed positioning, out of the normal document flow, relative to the browser window; relative is relative positioning, offset relative to its own position in the normal document flow; absolute is absolute positioning, out of the normal document flow, relative to the nearest positioned (non-static) parent element, or if no parent element has been positioned, relative to the browser window. positioning. To understand the static approach, students are required to have a deep understanding of the definition of block-level elements, row-level elements and in-line block elements, the teacher gives a set of elements, draw students to answer the results show. When explaining the relative way, let students give examples of relative positioning scenarios in life, and understand and remember that the reference object of the relative positioning way is themselves. It is more complicated to find the reference element of the absolute way, so use the nesting of elements in the developer tool to illustrate and demonstrate. Again, emphasize the representation of the element position. It is especially important to choose the correct orientation from the top, bottom, left and right directions, and emphasize the "proximity principle". Then, the teacher demonstrates the implementation process of the case and asks students which orientation to choose and which orientation to use. Finally, students work in groups of 3, each using a different way of expressing

their position, and do hands-on exercises to compare which way is the best and understand the law of understanding positioning.

3.5. Post- assessment

The post- assessment session is used to check whether students have completed the learning objectives. The teacher provides the effects and students complete the test using relevant materials based on what they have learned.

3.6. Summary

The task of the summary section is to summarize the knowledge points of this lesson and clarify the knowledge chain to further deepen students' impressions. Students will complete the knowledge review of this lesson, and other students can make additional explanations. On this basis, the teacher emphasizes the key points and difficulties, and comes up with the memory rule of "The child element is positioned absolutely and its parent element is positioned relatively".

4. CONCLUSION

According to the characteristics of the "Web Development Technology" course, this paper introduces the student-centered BOPPPS teaching model to carry out classroom teaching activities, in which teachers focus on what students "can learn" instead of what they "should teach", students can participate in learning in all aspects, teachers can get timely feedback from students, and effectively improve the classroom teaching effect of "Web Development Technology".

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