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Teaching Design of High School Artificial Intelligence Course Based on Theme Teaching Method

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Abstract

As an important member of senior high school information technology system, the course of Senior high School Artificial Intelligence plays an important role in the cultivation of students' quality education and the development of advanced thinking ability. However, in the actual teaching how to better this course, many teachers in this problem is confused. This paper adopts thematic teaching method to carry out teaching design. Surrounding the preparation before class, class, implement and organize the three teaching links, after class was designed using the teaching method in the artificial intelligence curriculum of high school teaching process, on the basis of preparation before class, class and after class teaching process, selection of east China normal university high school published by the "preliminary" artificial intelligence "has carried on the teaching of part teaching contents of teaching materials in the design.

Keywords

Subject teaching method; Artificial intelligence courses; The teaching design.

1. Introduction

In recent years, ai education has developed rapidly: several sets of teaching materials have been released; The linkage between AI enterprises and schools, the combination of industry and learning to seize the market; The AI project of youth Innovation Competition is gaining momentum; In the independent enrollment list of universities including Tsinghua university and Peking University, the proportion of students with special skills in informatics is also gradually increasing. Artificial intelligence was added to the high school information technology curriculum. In terms of senior high school artificial intelligence courses, it mainly cultivates students' computational thinking, information awareness, digital learning and innovation.

The emergence of artificial intelligence courses is also a great test for teachers. As an elective module reflecting the frontier field of information technology, "Preliminary Artificial Intelligence" is relatively unfamiliar to people due to its cutting-edge content, and there are still many deficiencies in teaching staff and the number of schools offering courses. Therefore, there is a long way to go in the research and exploration of the teaching implementation of this module. [1]

2. Ask Questions

At present, not many teachers know or are familiar with the content and methods of artificial intelligence courses, and more teachers know little about the content of artificial intelligence courses. As a newly set elective module, "Preliminary Artificial Intelligence" is necessary to conduct in-depth research and exploration in the interpretation of curriculum standards, textbook compilation, teaching methods and other aspects. However, at present, such research

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is rare, which also affects the progress of the course to a large extent. For the implementation of artificial intelligence courses, there is no effective teaching method.

There are altogether four sets of teaching materials for artificial intelligence in senior high schools. Through the analysis of these four sets of teaching materials, it is found that the selection of teaching contents cannot escape the three content modules knowledge and expression, reasoning and expert system, and artificial intelligence language and problem solving [2]. In terms of content arrangement and organization, these three content modules embody the characteristics of interpreting by example and reasoning by example. They advocate setting a theme as the basis of setting problem scenarios to stimulate students' thinking, analysis and exploration, so as to achieve the purpose of applying what they learn to practice. This is very consistent with the purpose of the theme-based teaching method adopted in this paper. The theme-based teaching method emphasizes the setting of problem scenarios for students with the theme as the carrier, and exercises students' ability to discover, analyze and solve problems.

3. Teaching Design Strategy of Artificial Intelligence Course Based on Theme Teaching Method

3.1. Organization Strategy Before Class

As a theoretical learner, teachers should learn while teaching. In the eyes of most teachers, "Preliminary Artificial Intelligence" is a difficult course to teach with unfamiliar teaching content, which requires teachers to learn relevant theoretical knowledge and teaching method knowledge, constantly enrich their teaching theories, and reflect and revise their own behaviors in constant practice. As a teaching organizer, teachers design and organize the teaching process methodically. In addition to determining teaching objectives, making teaching plans and understanding students' needs, teachers should also design learning activities and organize students to actively participate in each activity. For example, how to encourage students to effectively participate in the discussion and summarize and sublimate their views in the discussion, which occupies an important position in teaching, requires teachers to think and design carefully. Teachers themselves should also take an active part in teaching activities to guide and promote the active development of learning activities. There are many ways for teachers to participate in the teaching process, and listening in the discussion is also a good participation activity. The teacher as a learning partner means that the teacher is the learning partner of learners and guides and guides students to learn better when appropriate.

Teachers can dig deeply in the teaching design, create learning scenarios, stimulate students' learning foundation [3]. Internet resources make classroom teaching no longer focus on textbooks, but pay attention to the supplement and extension of textbooks, and pay attention to the relationship between textbooks and real life and students' social experience. Before class, teachers can let students collect relevant information on the network in advance, so that students feel that they have a sense of participation in the whole teaching process, and give play to students' subjectivity. Use mobile wechat to pay attention to some public accounts to let students know the content and information to learn, and master students' preview in advance on the online teaching platform. Micro-class can also be used to present learning content to students in advance to improve students' desire for knowledge. Teachers can design the corresponding teaching process according to the students' preview and master the materials to arouse students' interest and give full play to students' subjective initiative.

For example, students can collect information and pictures about the knowledge on the Internet in advance, and make use of the principle of "advance organizer" to let students know something about the knowledge. Then according to their own information collected on the Internet and their actual life, find their side of the relevant knowledge, enrich students' direct

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experience, let students feel that knowledge is no longer grasp, out of thin air, is conducive to students' understanding and mastery of knowledge. Finally, students are asked to submit the collected materials and information to the online teaching platform and watch the micro lesson of this class. It is suggested that students record the problems they encounter in the video and take these problems to the class. Teachers can adjust their teaching design according to the information submitted by students and their own opinions.

3.2. Organizational Strategies in Class

3.2.1. Organizational Principles

1. Adhere to the Student-centered Principle

Learning is students' independent behavior. Constructivism learning theory emphasizes that learning is a process in which students actively construct their internal mental representation. Therefore, teaching should be student-centered to ensure students' dominant status, and thematic teaching is no exception. Adhering to the student-centered principle also means that the whole process of thematic teaching cannot be separated from the participation of students. Every learning activity needs students' active response, active participation and completion, including analyzing data, searching resources, finding problems and determining plans, etc.

2. The Principle of Teaching Openness

To encourage the diversification of teaching results, student groups can give different problem-solving action plans through their own exploration of problems, and do not require the uniqueness of results, which is a manifestation of the principle of openness in teaching. On the other hand, it is necessary to leave space for students to explore and research. Teachers design certain difficult problem situations and encourage students to analyze, think and explore by themselves instead of rushing to help students find answers. Teachers only give certain guidance when necessary. In addition, students can continue to study the problems that have not been solved in class and consolidate what they have learned in the following stage of reflection and migration.

3. Pay Attention to the Principle of Performance Evaluation

The principle of performance-oriented evaluation should first pay attention to the evaluation of the learning process. Artificial intelligence is an application-oriented discipline, which focuses on the application of knowledge and the cultivation of students' ability. Teaching evaluation should pay more attention to students' performance in the process of solving problems and the degree of students' participation in discussions. Students should actively read, analyze and think in the teaching process, and improve the ability of analyzing and solving problems, rather than focusing on the results of students' memory of knowledge. Therefore, teaching should pay attention to the process of evaluation, pay attention to the learning process of students, students in teaching practice, comprehensive way to solve problems, focus on the application of knowledge, display high-level thinking ability to solve semi-structured and unstructured problems. The traditional paper evaluation can only evaluate the results of students' learning, which is more suitable for testing students' memory and understanding of basic facts and solving structural problems. Different from the traditional test paper evaluation, the performance evaluation not only evaluates what students "have learned", but also evaluates what students "can do". Performance evaluation observes students' thinking process. Usually, there is no unified standard for performance evaluation in the teaching process, which encourages students to give play to their creativity and individuality.

3.2.2. Implementation Process Design

According to the students' preview and learning characteristics of the course, the theme is set up and the situation related to classroom teaching is presented purposefully. Studies have shown that the amount of information obtained through a single visual or auditory can achieve

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80% above, so in the teaching process, should fully to the Internet and classroom integration, reasonable and fully stimulate and mobilize students' visual and auditory, arouse students' interest in teaching content, make students more strong more profound knowledge of artificial intelligence[4].

"Micro class" and PPT are skillfully used in classroom teaching. The implementation of "micro class" is bound to arouse students' interest, but we should not blindly use "micro class" in class and let students watch videos for learning while ignoring the leading role of teachers. Artificial intelligence is a subject with strong operability. Many operation steps may be difficult for students to understand or implement after teachers explain them theoretically. In addition, the study of theoretical knowledge is also boring for students, and students may not pay attention to it. In the operation of class, the teacher in teaching implementation premise before the difficult point of the lesson for the class to the students on a computer, then to the interpretation of the lesson, and then let the students in practical operation, at the time of difficulty, can let students by watching "small class" find my own shortcomings, so as to improve the ability of students to solve problems by themselves, The teaching of students is also more targeted. During the theoretical class, teachers can use PPT to improve students' interest and enrich students' perceptual understanding, avoiding the boring classroom phenomenon of learning theoretical knowledge.

3.3. After-class Organization Strategy

A good teaching process is accompanied by some feedback, and the effectiveness of the teaching should be tested after the class. Where conditions permit, after classroom teaching, students can submit questions they do not understand and homework to the network teaching platform, teachers can answer online and keep track of students' learning situation, and give play to students' individuality under the premise of unified teaching. Students are encouraged to actively express their opinions and discuss in the discussion forum by using small programs on wechat such as "Rain Class". Multiple evaluation methods can also be established to implement intra-group and inter-group mutual evaluation by way of sub-group.

For example, after learning a chapter of the course, students can post the questions and feelings they do not understand on the online teaching platform, so that teachers can answer questions online, and students and students can also communicate with each other. Teachers can put their own PPT and micro class on the teaching platform for students to learn. In addition, the students were divided into groups to complete a web page and upload it to "Rain Classroom". The group members and groups evaluated each other, and finally the teacher evaluated. The evaluation methods were diversified to improve the evaluation system.

4. Teaching Design Case of Artificial Intelligence Course in Senior High School

This case is designed from the second chapter of the high school artificial intelligence course.

High school "preliminary" artificial intelligence "in the second chapter of this book is mainly to introduce the students classifier algorithm in artificial intelligence, tell you the basic principle of machine recognition algorithm, for students, the machine identification algorithms are too complex programming is more difficult for students, so students are required to understand the simple principle of the algorithm, using VB programming. When designing teaching activities, determine a theme/activity for students, and complete the teaching task during the completion of the activity, as shown in Table 1:

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Table 1. Theme Activity Design

<table>
<tr><td colspan="6">Subject: Make a simple classifier</td></tr>
<tr><td rowspan="2">Project</td><td colspan="2">Activity</td><td colspan="3">The learning environment</td></tr>
<tr><td>Purpose</td><td>Content</td><td>Context, Resources and Tool</td><td>Community</td><td>Evaluation</td></tr>
<tr><td rowspan="5">Use VB to write the classifier function</td><td>Let the students master the concept of "characteristics"</td><td>Using VR, iris color and iris mountain color were observed in real situations</td><td rowspan="5">Teaching analysis: Artificial intelligence courses in senior high schools are scientific teaching materials, so students need to understand the general and basic working principles of artificial intelligence courses. Students are in senior high school with strong logic ability and complete cognitive structure system. The courses are elective courses and students have sufficient intrinsic motivation. Teaching methods: teaching method, task-driven method Resources and tools: computer room, virtual reality technology Duration: 2</td><td rowspan="5">Teachers and students learn together, students as the main body, through task-driven teaching method.</td><td rowspan="5">Result-oriented evaluation: evaluate students' PPT report and coding procedures, including students' self-evaluation, teachers' evaluation and group evaluation. Formative evaluation: teachers observe students' enthusiasm in learning and how they complete tasks in the learning process.</td></tr>
<tr><td>Abstract features, let students understand and master the concept of "feature vector"</td><td>Students were required to actually measure ten groups of irises and color-changing irises and record the data</td></tr>
<tr><td>Let the students master the concept of "feature point" and "feature space"</td><td>Students begin to draw feature points on the mathematical coordinate axes and give students the concept of feature points and feature space</td></tr>
<tr><td>Let students understand the basic principles of classifier functions</td><td>Build the classifier function by looking at the coordinate image you draw</td></tr>
<tr><td>On the basis of mastering the principle of classifier, let the students test the classifier function written, and understand that the classifier function is to pass training</td><td>Let the students continue to observe irises and color-changing irises through VR, input feature points for classification and test the classifier function constructed by them</td></tr>
</table>

The final evaluation evaluates the whole group according to the works completed by students, and evaluates the group's works by self-evaluation, mutual evaluation and teacher evaluation. The evaluation criteria are shown in Table 2 below:

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Table 2. Group rating scale

Group rating scale		
Evaluation of project	Evaluation content	Score (1 to 10 points)
Project Production status	Basic realization of project functions, including project design scheme, work instructions, etc	
The team cooperation	The division of labor is clear and reasonable	
Share the show	Clear logic, complete content, loud voice	
The average score		

For the final score of each member in the group, the evaluation of the group leader, the evaluation of the teacher and the score of the group are adopted to score each student, as shown in Table 3 below:

Table 3. Group member evaluation scale

Group member evaluation scale				
Members	Team score	Score in the group	The teacher ratings	The average score
Member1				
Member2				
Member3				
Member4				

Table 4 shows the teaching process of content design in section 1 of Chapter 2 of high school Artificial intelligence course according to the set theme and scoring standard:

5. Summary

When artificial intelligence courses enter the information technology curriculum system of senior high schools, they are short, and students and teachers lack sufficient understanding of the subject. This paper focuses on three teaching links: preparation before class, classroom implementation and after-class organization, and specifically designs the implementation process of theme-based teaching method.

The theme-based teaching method proposed in this paper only provides a relatively suitable teaching method for teachers to teach artificial intelligence courses in senior high schools. However, this does not preclude some content from being applicable to other teaching methods as well. Thematic teaching method only provides a way of thinking for teachers to teach this course, but does not mean that it is the only teaching method.

In addition, theme teaching, like all other teaching methods, has its own limitations and requires teachers to pay more energy. It is not recommended that a single course be taught by subject-based teaching, but that all kinds of teaching methods should be reasonably distributed and play a role together. Finally, it is a great pity that the paper did not test the practical effect in middle school. If there is an opportunity, I hope I can personally practice this teaching method in high school artificial intelligence courses.

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Table 4. The teaching design

Teaching material analysis	The status of content in teaching materials	The second chapter of the book "Preliminary Artificial Intelligence" in high school mainly introduces the classifier algorithm in artificial intelligence to students and tells them the basic principle of machine recognition algorithm. As the basic part of the textbook, only understanding this part can provide necessary support for future study.
	Learning analysis	Senior high school students have the ability to concentrate and think independently, and have mastered the basic knowledge of computers.
The teaching goal	Knowledge and Skills	1. Master the basic concepts and processes of classification; 2. Master the basic concepts of classification, feature, feature vector and feature space in artificial intelligence; 3. Understand classifier algorithms; 4. You can program a simple classifier with VB.
	Process and Method	1. Master the ability of thinking in the process of programming functions; 2. Understanding the methods of computer thinking; Develop your programming skills.
	Emotional attitudes and values	1. Cultivate students' general understanding of artificial intelligence courses; 2. Establish students' interest in artificial intelligence courses, and establish a correct view of science and technology.
Teaching Key points		Master the basic principle of classifier algorithm.
Teaching method		Subject teaching method
The teaching process	Preparation before class	Let the students organize and save the information about artificial intelligence autonomous recognition collected in the last class, upload the information they have collected on the network teaching platform, and explore the phenomenon of artificial intelligence classification around their lives. Teachers browse and record the information and ideas uploaded by students before class, and make PPT according to students' information and feelings.
	The import	The information uploaded by students to the online teaching platform was selectively displayed on the CLASSROOM PPT, and the students were asked to talk about the phenomenon of artificial intelligence classification around them or the equipment and their understanding of artificial intelligence knowledge. Teacher: The appearance of artificial intelligence is changing our life, our study and life become more convenient because of the appearance of artificial intelligence. Just now, we have said a lot of examples and phenomena about artificial intelligence, so how does artificial intelligence recognize all kinds of information? How do they classify it? Today we all try to make a simple classifier function!
	Teach	Use virtual reality technology to have students observe color-changing irises and mountain irises and talk about the differences between them. Teacher: Let's talk about how you can distinguish the color changing iris from the mountain iris. S: by looking at their length and width..... Teacher: Since we can distinguish it in this way, how can artificial intelligence distinguish it? Can they see with their eyes like us? S: no..... T: Well, we just distinguished them by the length and width of the flowers, which are the key characteristics of these two flowers. So can we tell the computer what the distinguishing feature is and tell it to differentiate according to it? Introduce the concept of features T: How do we let the computer know the difference? Just tell it the words? S: computers operate in binary system. they don't know binary. T: Yes, so we need to convert the method into a value and input it into the computer Introduce the concept of characteristic variable T: Is it too much trouble if we see a flower and input its value into the computer? It's too much work! S: yes T: Do you have any good ideas? The teacher had a solution, which was to measure some data of these two flowers and then abstract the data into functions to classify them. Lead the students to measure the height and width of flowers through virtual reality technology and record. Introduce the concept of feature space. After drawing the feature space, let the students observe in the coordinate system and draw the classification function Finally, the composition of the classifier function is summarized, and let the students use VB coding to build a simple classifier function.
	Brief summary	Lead the students to write on the blackboard and sort out the knowledge points learned in this class.
	Homework after class	According to the knowledge learned in this class, the students made a classifier function and made a PPT report. The teacher recorded the steps of making classifier functions into micro lessons and put them on the network teaching platform for students' reference.
Teaching reflection		

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