



Construction and Practice of Curriculum Knowledge Map Based on Problem Orientation

Wei ju Song¹, Xin xin Wang²

¹School of Civil Engineering, Hebei University of Engineering, Handan, China

²School of Humanities and Law, Hebei University of Engineering, Handan, China

Email: nimrodsong@126.com

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Abstract

In traditional teaching models, teachers usually center their teaching around knowledge and follow preset teaching plans. However, students' learning outcomes are often influenced by various factors, including their own interests and cognitive levels, as well as the difficulty level and practical application of the teaching content. In this paper, a teaching method based on problem-oriented curriculum knowledge map construction and practice is proposed, which promotes active learning and deep thinking by introducing students' questions into the classroom and constructing course knowledge maps around these questions. This method aims to enhance students' learning outcomes. Firstly, the disadvantages of the traditional teaching mode are analyzed. Then, the theoretical basis and implementation steps of the teaching method based on the problem-oriented curriculum knowledge map construction and practice are introduced. Finally, through analysis and summary of practical cases, the feasibility and effectiveness of this teaching method are validated.

Subject Areas

Educational Technology, Language Education

Keywords

Problem-Based, Course Knowledge Maps, Teaching Reform, Learning Outcomes, Construction Laws and Regulations

1. Introduction

In the traditional teaching model, teachers typically focus on knowledge and follow a predetermined teaching plan. However, students' learning outcomes are

often influenced by various factors, including their interests and cognitive levels, as well as the difficulty and practical application of the teaching content. Therefore, a teaching model that solely focuses on knowledge often fails to inspire students' interest and initiative, resulting in poor learning outcomes [1] [2].

A curriculum knowledge map is a tool that graphically displays the structure and relationships of curriculum knowledge, which can help the students better understand and remember course content. In recent years, with the continuous development and popularization of educational technology, the research and application of curriculum knowledge maps have become increasingly widespread [3] [4] [5]. Curriculum knowledge maps can be used in teaching design, learning guidance, learning evaluation, and other aspects. In terms of teaching design, curriculum knowledge maps can help teachers better organize and arrange course content, ensuring the logical relationships and importance between knowledge points [6] [7] [8]. In terms of learning guidance, curriculum knowledge maps can help students better understand and remember course content, thereby improving learning outcomes. In terms of learning evaluation, curriculum knowledge maps can help teachers comprehensively and accurately evaluate students' learning situations, thereby better guiding their learning [9] [10] [11].

This article proposes a problem-based teaching method for curriculum knowledge map construction and practice. By introducing students' questions into the classroom and constructing the curriculum knowledge map around these questions, this method promotes students' active learning and deep thinking, thereby improving learning outcomes.

2. Theoretical Basis of Problem-Based Curriculum Knowledge Map Construction and Practice

Problem-based teaching emphasizes student-centered learning, introducing problems into the classroom, and constructing curriculum knowledge maps based on problems, which promotes active learning and deep thinking by students. This teaching method is based on several theoretical foundations.

2.1. Constructivist Learning Theory

Constructivist learning theory holds that students need to actively construct their own knowledge structures based on their experiences and cognitive abilities. Therefore, problem-based teaching can promote student-initiated thinking and knowledge construction. Students no longer just passively accept knowledge, but can actively participate in the learning process. Problem-oriented teaching method can not only stimulate students' interest and motivation in learning, but also promote students' creative thinking and problem-solving ability.

In the process of problem-oriented teaching, teachers can ask a series of challenging questions to encourage students to think and explore. In the process of finding the answers to questions, students can construct their own knowledge

structure, find mistakes and deficiencies, and then constantly improve their own knowledge system.

Constructivist learning theory also emphasizes students' socialized learning process. Students can share each other's experiences and ideas in the interaction and cooperation with others, and constantly build and improve their knowledge structure in the process of mutual discussion and cooperation. This kind of interaction and cooperation can not only promote students' learning, but also improve students' communication and cooperation ability.

2.2. Problem-Solving Learning Theory

Problem-solving learning theory holds that students acquire knowledge by solving practical problems, thus applying theoretical knowledge to real situations. Therefore, problem-based teaching can help students apply theoretical knowledge to practical problems.

In addition, problem-solving learning theory also emphasizes students' autonomy and cooperation. In the process of problem-solving, students need to think, explore and try actively, while teachers should act as guides to help students clarify and analyze problems, and provide necessary guidance and support.

Through the teaching method of problem-solving learning theory, students can not only apply theoretical knowledge to practical situations, but also exercise their thinking ability, innovation ability and problem-solving ability. At the same time, students can share experiences, exchange ideas and complete tasks together through cooperation with classmates, so as to further improve their learning effect and comprehensive quality.

In practical teaching, teachers can arouse students' interest and initiative by asking challenging and enlightening questions, and guide them to explore and solve problems. At the same time, teachers can also organize students to cooperate in groups, encourage students to share experiences, exchange ideas, help and encourage each other, and create a positive learning atmosphere.

2.3. Cognitive Psychology Theory

Cognitive psychology theory holds that the learning process involves cognitive construction and reorganization, and students need to relate and integrate new and old knowledge. Problem-based teaching can help students relate and integrate new and old knowledge. According to the theory of cognitive psychology, when students learn new knowledge, they need to associate and integrate the new knowledge with the old knowledge in order to better understand and apply the new knowledge. Therefore, in the teaching process, teachers should fully consider students' existing knowledge structure and cognitive ability, so as to design corresponding teaching strategies and methods, so as to better promote students' cognitive construction and reorganization.

Besides the problem-oriented teaching method, there are other teaching methods that can effectively promote students' cognitive construction and reorgan-

ization. For example, heuristic teaching method can promote students' cognitive construction and reorganization by guiding students to discover knowledge and solve problems independently; Case teaching method can help students combine new knowledge with practical application through practical cases, so as to better understand and apply knowledge.

3. Construction and Implementation of Problem-Based Course Knowledge Maps

3.1. Construction Process

The construction process of curriculum knowledge map based on problem orientation is shown in **Figure 1**.

Course analysis and problem identification: Before constructing a problem-based course knowledge map, it is necessary to fully analyze and understand the course objectives and learning content. At the same time, it is important to identify relevant problems from the perspective of students to stimulate their learning interest and curiosity.

Map element design: A problem-based course knowledge map should include elements such as main topic questions, sub-questions, concepts, principles, examples, and cases. These elements need to be organized and presented in a logical relationship to form a clear knowledge structure.

Map creation and adjustment: During the map creation process, appropriate tools and methods such as mind maps and concept maps should be used. After the map is created, it should be adjusted and optimized to ensure the rationality and completeness of the knowledge structure.

Through the construction process, we can find that teachers first need to determine the learning objectives that students need to achieve and design a teaching plan accordingly. During the lesson, teachers can introduce problems to encourage students to think and explore, thereby stimulating their learning interest and initiative. Based on the problems identified by students, a course knowledge map can be constructed to integrate and classify knowledge points, helping students establish a knowledge system. Students can then explore and apply theoretical knowledge to practical situations to solve problems. Finally, teachers should evaluate students' learning outcomes and processes, allowing them to reflect on the difficulties and gains of the learning process and improve their learning effectiveness and motivation.

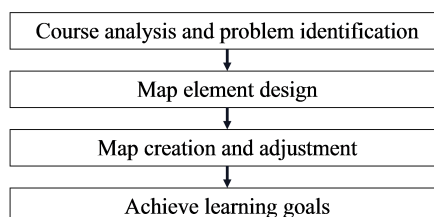


Figure 1. Construction process of curriculum knowledge map based on problem orientation.

The problem-based course knowledge map construction and implementation teaching method can be applied to teaching various subjects. In practice, teachers can conduct targeted teaching design and implementation based on specific subjects and students' situations.

3.2. Implementation Steps

The implementation steps of the problem-based teaching method are shown in **Figure 2**.

Determine learning objectives: Determine the learning objectives that students need to achieve and design the teaching plan accordingly.

Introduce problems: Introduce problems in the classroom to encourage students to think and explore, thereby stimulating their interest and initiative in learning.

Construct knowledge maps: Based on the problems raised by students, construct knowledge maps of the course, integrate and classify knowledge points, and help students establish a knowledge system.

Explore solutions: Encourage students to explore and solve problems, and help them apply theoretical knowledge to practical situations.

Evaluate and reflect: Evaluate students' learning outcomes and processes, encourage students to reflect on the difficulties and achievements in the learning process, and improve their learning effectiveness and motivation.

4. Case Study on Constructing and Practicing a Problem-Oriented Course Knowledge Map

To validate the effectiveness of the problem-oriented course knowledge map construction method, we chose the "Construction Laws and Regulations" course for practical application. The aim is to introduce the basic content and application of construction regulations. In the course design, we took "How to apply construction regulations to solve practical problems" as the main topic question, and proposed a series of related sub-questions. We organized and presented them with concepts, principles, examples, and cases, and constructed a problem-oriented course knowledge map.

Firstly, we need to determine the construction objectives and scope of the

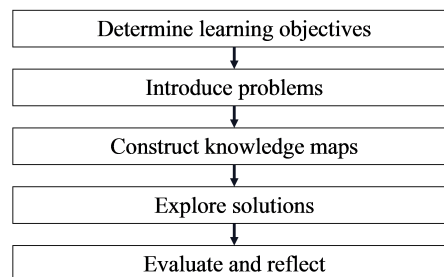


Figure 2. Implementation steps of problem-based teaching method.

“Construction Laws and Regulations” course knowledge map. Based on this, we can use the following steps to construct the knowledge map:

Define the knowledge domain and knowledge points: Analyze the course outline and textbook content to determine the knowledge domain and knowledge points of the “Construction Laws and Regulations” course and transform them into a visual knowledge graph.

Determine the relationships between knowledge points: Classify and summarize the relationships and dependencies between different knowledge points to form the framework of the knowledge map.

Determine the importance and difficulty of knowledge points: Evaluate the importance and difficulty of knowledge points based on teaching experience and student feedback, thus determining their position and importance in the knowledge map.

Optimize the knowledge map: Continuously revise and improve the knowledge map, optimize it through teaching practice and student feedback, and ensure its accuracy and practicality.

Apply the knowledge map: Apply the knowledge map to teaching practice, continuously optimize and improve the course teaching effect through continuous practice and feedback, and improve students’ learning effectiveness and knowledge mastery.

In teaching practice, we guided and explained the knowledge map to help students deepen their understanding and mastery of the course content, and encouraged them to use their creativity and thinking skills in exploring problems. At the same time, we introduced case studies and practical activities to allow students to apply their learned knowledge to real-world problems, and to discover and solve problems through practical experience.

Through practical application, we found that the problem-oriented course knowledge map construction method can effectively enhance students’ learning interest and learning effectiveness. In the process of exploring problems, students are often able to actively participate and express their own views and thinking, thereby enhancing their learning motivation and participation. In addition, the organization and presentation of the knowledge map also helps students to grasp and understand the knowledge as a whole, promoting their in-depth learning and mastery.

5. Teaching Reform Inspiration

The problem-oriented course knowledge mapping method is an effective course design method that can help students better understand and apply course knowledge. In the teaching reform of the course, we should pay attention to students’ subjectivity and participation, guide them to acquire knowledge from problems, and improve their creativity and thinking ability. At the same time, we should make full use of information technology tools, such as the Internet, mobile devices, etc., to provide students with diversified and convenient learning methods and resources.

In addition, the problem-oriented curriculum knowledge map construction method is a curriculum design method that emphasizes students' active inquiry and thinking, which can help students better understand and apply curriculum knowledge. In this method, teachers take students' learning problems as the starting point, construct curriculum knowledge maps, and guide students to actively explore and solve problems, so as to enhance the depth and breadth of knowledge.

In the teaching reform, we should pay attention to students' subjectivity and participation. Traditional classroom teaching mode is teacher-centered, and students are only passively accepting knowledge, which easily leads to the decline of students' interest and motivation in learning. Therefore, we should advocate students' active inquiry, independent thinking and cooperative learning, and cultivate students' autonomous learning ability and team cooperation ability.

Guiding students to acquire knowledge from problems is an effective way to cultivate students' creativity and thinking ability. In the learning process, teachers can put forward some open questions, guide students to think and explore, and cultivate students' innovative thinking and problem-solving ability. At the same time, students can also ask their own questions to promote the interaction and in-depth exploration of the course.

Information technology is an indispensable and important means of teaching reform. The application of new technologies such as the Internet and mobile devices can provide students with diversified and convenient learning methods and resources. For example, students can get more comprehensive and rich knowledge and information through network search, and can also use mobile devices to learn and communicate anytime and anywhere. Teachers can also use information technology to realize the construction and display of curriculum knowledge map, and improve classroom teaching effect and teaching quality.

6. Challenges and Limitations

There are also some potential challenges and limitations when applying this problem-oriented curriculum knowledge map construction method.

First of all, the construction of a curriculum knowledge map requires teachers to have a high level of subject knowledge and teaching experience, so as to accurately identify problems and related knowledge points. If teachers lack this ability, it may lead to the inaccurate and complete knowledge map, which will affect students' learning effect.

Secondly, the problem-oriented curriculum knowledge map needs teachers to have enough patience and energy to plan and construct carefully, which requires a lot of time and energy. Therefore, if teachers are busy or lack time, it may be difficult to complete this task, thus affecting students' learning effect.

In addition, students' learning interest and learning effect are also influenced by many factors, such as family environment, social background, learning habits and so on. Even if the problem-oriented curriculum knowledge map construction method is adopted, teachers and students still need to make joint efforts to

improve students' learning interest and learning effect through classroom teaching and extracurricular autonomous learning.

To sum up, the problem-oriented curriculum knowledge map construction method has many advantages, but there are also some potential challenges and limitations. In practice, we need to use this method flexibly according to specific conditions, and continuously improve and perfect it, so as to improve the quality of education and teaching and promote the deepening of education and teaching reform.

7. Conclusion

In this paper, a problem-oriented method of curriculum knowledge map construction is proposed and applied in practice. The results indicate that this method can effectively improve students' learning interest and learning outcomes, providing strong support for the teaching reform of the curriculum. In future educational practices, we should further explore and study the specific application and implementation methods of this method to promote continuous innovation and development in education and teaching.

Conflicts of Interest

The authors declare no conflicts of interest.

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