

The influence of middle school teaching methods on students' critical thinking and problem-solving ability

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Abstract: Research shows that critical thinking refers to the ability of students to think, analyze, evaluate and reason independently when facing problems. Problem-solving ability refers to the students' ability to use their existing knowledge and skills to find appropriate solutions. These competencies are essential for students to become creative and competent decision-makers. Middle school teaching methods have a positive impact on students' critical thinking and problem-solving ability. For example, the enlightening teaching method emphasizes guiding students to explore independently and cultivate their critical thinking ability. Through activities such as open questions, group cooperation and exploratory experiments, students can not only actively think about problems, but also put forward their own views and discuss and debate with others. This teaching method cultivates students' logical thinking, problem solving and innovation ability. Problem-centered teaching is another effective teaching method that promotes their critical thinking and problem-solving skills by placing students in the context of solving practical problems. This teaching method encourages students to proactively ask questions, collect information, and conduct in-depth research, to help students understand the complexity of the problem and pursue various solutions. In the process of exploring practical problems, students can not only develop their critical thinking skills, but also improve their collaboration and communication skills. The application of technology in middle school teaching also plays an important role in promoting students' critical thinking and problem-solving ability. For example, using e-teaching platforms can provide students with more resources and information to help them better understand the problem and propose solutions. At the same time, digital learning tools and network collaboration platforms also provide channels for students to communicate and cooperate, further cultivating their critical thinking and problem-solving skills. In the choice and use of the use of teaching methods, the role of teachers is crucial. Teachers should be mentors and guides for students to provide appropriate support and guidance for students.

Keywords: middle school teaching methods; students; critical thinking; problem-solving ability

1. Introduction

With the development of society and the advancement of educational reform, cultivating students' critical thinking and problem-solving abilities has become a focus of attention in the education sector. The middle school stage is an important period for the development of students' thinking, therefore, exploring the impact of middle school teaching methods on students' critical thinking and problem-solving abilities is of great practical significance. Teaching method is a mutual activity method adopted by teachers and students in the process of education and teaching to achieve common teaching objectives. Different teaching methods have different impacts on students' critical thinking and problem-solving abilities. Therefore, studying the impact of high school teaching methods on students' critical thinking and problem-solving abilities can help teachers choose appropriate teaching methods, optimize classroom teaching, and improve students' critical thinking and problem-solving abilities.

2. Definition of critical thinking and problem-solving skills

Critical thinking and problem-solving skills are important core competencies in secondary education, which involve students' ways of thinking, analytical skills, and problem-solving skills. The following will expand the definition of critical thinking and problem-solving ability, and explore its importance and training methods in secondary education^[2].

Critical thinking involves the student's ability to think, analyze, and evaluate problems

independently. This includes thinking deeply about the problem, not only to the surface of the problem, but also to the causes and logic behind the problem. Critical thinking requires students to be able to form their own opinions and arguments by collecting, organizing and evaluating information, and to make reasonable judgments. This kind of thinking ability has an important influence on students' academic achievement, innovation ability and logical thinking ability.

Problem-solving ability refers to the ability of students to cope with various challenges and problems and find appropriate solutions. Problem-solving skills cover students' thinking, creativity and decision-making skills. Students need to be able to use the existing knowledge and skills, analyze the elements and conditions of the problem, and find solutions to the problem through reasoning and practice. The cultivation of problem-solving ability is not only helpful to students' academic performance, but also has an important impact on their real life and career development^[3].

Critical thinking and problem-solving skills are important in secondary education. First of all, they cultivate students' learning ability and self-learning ability. Through critical thinking, students can actively think about problems, not only passively accept knowledge, but also can conduct deep thinking and independent analysis. Problem-solving ability enables students to take the initiative to respond to various challenges and problems and actively find solutions. These abilities enable students to be more confident and independent academically and to better cope with various problems and difficulties in learning.

Critical thinking and problem-solving ability develop students' innovative ability and creative thinking. Through critical thinking, students are able to think about multiple perspectives and find innovative solutions. Problem-solving ability enables students to propose new ideas and solutions when facing new challenges and problems. These abilities are critical to the students' creativity and innovation in their career^[4].

3. The importance of middle school teaching methods

The choice and application of middle school teaching methods is crucial for students' learning outcomes and learning experience. Different teaching methods can stimulate students' interest in learning, develop their thinking ability and problem-solving ability. Enlightening teaching methods emphasize students' active participation and independent inquiry. Through teaching activities such as open questions, group cooperation and exploratory experiments, students can develop critical thinking and problem-solving ability. Problem-centered teaching stimulates students' critical thinking and problem-solving skills by placing them in a practical problem-solving situation. Teachers can also use technical tools and resources to support students' learning, providing more learning opportunities and diversified teaching resources to promote the development of students' critical thinking and problem-solving skills^[5].

Middle school teaching methods have an important influence on students' cognitive development. Through appropriate teaching methods, students can get more cognitive stimulation and learning experience, and promote their thinking ability. Enlightening teaching methods and problem-centered teaching methods emphasize students' ability to think actively and solve problems independently. These methods provide opportunities for students to interact and discuss with teachers and peers, enabling students to continuously push their own thinking boundaries and develop critical thinking and problem solving skills. This cognitive development has a long-term impact on students' learning and knowledge accumulation^[6].

The selection and application of teaching methods in middle school can also cultivate students' cooperation and communication skills. Cooperative learning and group activities are important components of many teaching methods that encourage students to cooperate, communicate and share perspectives with each other. By working with peers to solve problems, conduct discussions and debates, students are able to develop critical thinking and problem-solving skills and improve their teamwork and communication skills. These abilities have important implications for both student personal development and their future career^[7].

The selection and application of middle school teaching methods can also cultivate students' innovation and problem-solving ability. Innovation is one of the important abilities needed in today's society, and critical thinking and problem-solving ability are an important part of innovation ability. Through enlightening teaching methods and problem center teaching methods, students can put forward innovative ideas and solutions in the process of solving practical problems. These methods can

also develop students' problem-solving skills, enabling them to skillfully use their existing knowledge and skills to solve practical problems.

Middle school teaching methods are of great importance to the cultivation of students' critical thinking and problem-solving ability. Appropriate teaching methods can stimulate students' interest in learning and improve students' cognitive ability and learning results. Teachers can develop students' critical thinking and problem-solving skills through enlightening teaching methods, problem-centered teaching, and using technical tools. These methods can also promote students' cooperation and communication skills, and develop students' innovation and problem-solving skills. The choice and application of teaching methods in secondary schools have important influences in student educational development and lifelong learning^[1]. Therefore, we should continue to explore and innovate the teaching methods to meet the needs of students, in order to promote the all-round development of students.

4. The influence of enlightening teaching methods on critical thinking and problem-solving skills

The enlightening teaching method is a student-centered teaching method that aims to develop students' critical thinking and problem solving ability by stimulating their interest and potential. The core of this teaching method is to let students actively explore, think and ask questions under the guidance of teachers, so as to cultivate their critical thinking and problem-solving ability. This paper will explore the implications of enlightening teaching methods on critical thinking and problem solving skills from both theoretical and practical aspects^[8].

On the theoretical level, enlightening teaching methods can promote the development of students' critical thinking and problem solving skills. According to Piaget's cognitive development theory, the enlightening teaching method provides an environment for students to actively participate in learning and encourages them to construct knowledge through their own practice and thinking. In this process, students need to constantly observe, compare, reason and validate to develop their critical thinking ability. At the same time, enlightening teaching methods also encourage students to take a proactive attitude when facing problems, and exercise their problem-solving ability through analysis and problem solving.

On the practical level, enlightening teaching methods develop students' critical thinking and problem solving skills through a variety of teaching strategies and activities. For example, enlightening teaching methods often use teaching activities such as case studies, discussion, inquiry and experiments, so that students can analyze and solve practical problems, and pay attention to cultivating students' cooperative ability and creativity. Through these activities, students can not only understand and master the knowledge, but also use the knowledge to conduct critical thinking and problem solving, and improve their comprehensive ability.

5. Impact of problem center teaching on critical thinking and problem solving skills

Problem-centered teaching is a teaching method, whose core idea is to place problems in the central position of teaching, and to cultivate students' critical thinking and problem-solving ability by stimulating their curiosity and desire to explore. The problem center teaching takes practical problems as the starting point and end point^[9]. Through students' independent inquiry, cooperative solution and reflective summary, they can cultivate and develop critical thinking and problem solving ability. This paper will explore the influence of problem-centered teaching on critical thinking and problem-solving skills from two aspects, and make relevant teaching suggestions.

Problem center teaching can promote the development of critical thinking. In problem center teaching, students need to solve problems by asking questions, collecting information, analyzing and comparing, and reasoning. These processes require students' critical thinking skills, including thinking and evaluating different perspectives, identifying facts and claims, and analyzing and comparing different solutions. Through repeated these critical thinking activities, students' critical thinking ability will gradually be cultivated and developed.

Problem-center teaching can cultivate students' problem-solving ability. In problem center teaching, students need to actively participate in the problem solving process, and find methods and strategies to solve problems through cooperation, inquiry and practice. This practical problem solving process can exercise students' problem solving ability, including analyzing problems, developing solutions,

implementing plans and evaluating results. Through repeated problem-solving activities, students' problem-solving ability will be gradually improved.

In conclusion, problem-centered teaching has an important impact on cultivating students' critical thinking and problem-solving skills. Through problem-centered teaching, students can think and solve problems through critical thinking, and develop and develop problem-solving abilities in the process of problem-solving practical thinking. However, to implement effective problem center teaching, teachers need to have certain teaching skills and knowledge level, and provide adequate resources and support. Therefore, in teaching practice, teachers should rationally use problem-centered teaching methods according to students' actual situation and subject characteristics, so as to promote the development of students' critical thinking and problem-solving ability^[10].

6. Effect of the application of technology in middle school teaching on critical thinking and problem solving skills

The application of technology in secondary school teaching has great implications on the influence of critical thinking and problem solving ability. With the continuous development of science and technology, educational technology is becoming a key component of middle school teaching. The application of educational technology can provide more resources and tools to stimulate students' interest and initiative in learning, and cultivate their critical thinking and problem-solving skills. This paper will explore the influence of the application of technology in middle school teaching on critical thinking and problem solving skills from both theoretical and practical aspects.

On the theoretical level, the application of technology in middle school teaching helps to promote the development of students' critical thinking. According to Vygotsky's sociocultural theory, students construct knowledge by interacting with others and the environment. Educational technology provides a new way of interaction, such as online discussion platforms, virtual labs and simulation software, allowing students to collaborate, share and communicate with others to develop their critical thinking skills. Through the online discussion platform, students can have in-depth academic discussions with their classmates and teachers, ask questions, clarify opinions, discriminate and argue, so as to exercise their critical thinking. Virtual laboratory and simulation software can provide a platform for practice and exploration, where students can find problems, analyze phenomena, and propose solutions, and develop their critical thinking skills.

On the practical level, the application of technology in middle school teaching helps to cultivate students' problem-solving ability. Educational technology provides more resources and tools to help students proactively explore and solve problems. For example, students can access rich information resources through the Internet and electronic libraries to better understand and solve problems. Through online learning platforms and educational software, students can learn according to their own learning goals and progress, and improve their self-learning and self-management skills. In addition, educational technology can also provide tools and platforms for problem-solving, such as programming software and modeling tools, where students can solve problems through practical operation and practice, and develop their problem-solving ability.

The application of technology in middle school teaching also faces some challenges and limitations. First of all, the application of technology in middle school teaching requires teachers to have certain technical ability and knowledge, and can flexibly use educational technology to teach. Secondly, the application of technology requires sufficient resources and support, including equipment, network and software, to ensure the effective use of technology. In addition, the learning motivation and technical literacy of students and parents also play an important role in the application of technology in middle school teaching.

7. Teaching strategies for cultivating critical thinking and problem-solving abilities in middle school students

7.1 Transforming Teaching Concepts and Emphasizing Student Subjective Status

In traditional teaching models, teachers often play the role of knowledge transmitters, while students are considered recipients of knowledge. However, this teaching model is not conducive to cultivating students' critical thinking and problem-solving abilities. In order to change this situation, teachers need to change their teaching concepts, emphasize the subjectivity of students, hand over the

classroom to students, and make them the masters of learning. Teachers should respect the interests and needs of students and design teaching centered around them. This means that teachers should pay attention to the personalized development of students, adjust teaching content and methods according to their actual situation, in order to stimulate their learning interest and enthusiasm. Teachers should encourage students to actively participate in classroom discussions and guide them to actively ask questions and express their opinions. This helps to cultivate students' problem awareness and critical thinking abilities. When students are brave and good at asking questions in the classroom, they are more likely to discover, analyze, and solve problems. Teachers should be good at guiding students to think independently and encouraging them to express their own opinions. This helps cultivate students' ability to think independently and make judgments, enabling them to make rational decisions when facing complex problems. Teachers also need to pay attention to the psychological health and emotional needs of students, and create a relaxed, free, and safe classroom atmosphere.

7.2 Creating problem scenarios to stimulate students' curiosity

Curiosity is an important driving force for human exploration and innovation, as well as a key factor in cultivating students' critical thinking and problem-solving abilities. In order to stimulate students' curiosity, teachers need to create problem scenarios, introduce students into real or simulated real-life scenarios, and cultivate critical thinking and innovative abilities in the process of problem-solving. Teachers should design challenging, interesting, and exploratory questions based on the teaching content and the actual needs of students. These questions can be relevant to daily life and meet the cognitive level of students, in order to stimulate their curiosity. At the same time, questions should have a certain degree of openness, encouraging students to think and analyze from different perspectives and using multiple methods. Skilled in guiding students to identify and raise questions. In the teaching process, teachers can consciously introduce some contradictions, suspense, or doubts to make students aware of the existence of problems, thereby stimulating their interest in exploring problems, encouraging students to dare to raise their own questions and opinions, respecting their ideas, and providing them with a platform for free expression and free speech. In such an atmosphere, students' curiosity will be better protected and stimulated to pay attention to the creation of problem situations, enabling them to fully unleash their imagination and creativity in the process of solving problems. Problem scenarios can be diverse, such as experiments, case studies, group discussions, etc., to meet the needs and interests of different students.

7.3 Carry out cooperative learning and cultivate students' teamwork skills

Collaborative learning is an educational method aimed at improving students' critical thinking and problem-solving abilities. Through this learning method, students can communicate with each other, share knowledge and experience, learn from each other's strengths and weaknesses, thereby improving the overall performance of the team. Reasonable grouping is the foundation for conducting cooperative learning. Teachers can divide students into several cooperative learning groups based on their interests, strengths, learning levels, and other factors. The number of group members should not be too large to ensure that each member can fully participate in discussions and exchanges. Teachers should provide students with a platform and opportunities for collaborative learning. During the teaching process, teachers can design tasks or activities related to collaboration, such as group discussions, project research, and project implementation. These tasks should have a certain level of challenge and openness, encouraging students to fully unleash their intelligence and creativity. Cultivate students' teamwork awareness. In the process of cooperative learning, teachers need to guide students to recognize the importance of teamwork, learn to respect and listen to the opinions of others, take common goals as the starting point, and work together. Pay attention to the performance and progress of students in cooperative learning, and provide timely guidance and assistance. In the process of cooperative learning, students may encounter various problems, such as poor communication and unclear division of labor. Teachers should pay attention to these issues and guide students to communicate with each other and solve them together when encountering problems. Pay attention to cultivating students' communication skills and negotiation skills. In collaborative learning, students need to share their ideas and perspectives with team members to reach consensus.

7.4 Utilizing Multivariate Evaluation to Promote the Comprehensive Development of Students

Multivariate evaluation is an educational evaluation method that comprehensively and objectively evaluates student development. It focuses on various factors such as students' personality, interests,

strengths, and abilities, aiming to provide a fair and impartial evaluation system for students, and stimulate their learning interest and potential. Teachers need to change their evaluation concepts and establish a comprehensive development evaluation concept. When evaluating students, teachers should pay attention to their knowledge, abilities, emotions, attitudes, and other aspects, rather than just limited to their academic performance. Design diverse evaluation methods. When evaluating students, teachers can use various evaluation methods, such as written exams, oral exams, homework, classroom performance, group discussions, parent evaluations, etc. These evaluation methods can reflect students' learning and development from different perspectives, providing comprehensive reference for teachers. Pay attention to the process of evaluation and focus on the growth of students. Teachers should continuously monitor the learning process of students, timely understand their needs, difficulties, and problems in learning, and provide necessary help and support to students. Emphasize the diversification of evaluation subjects. When evaluating students, teachers can invite students, parents, classmates, etc. to participate together, forming a diverse evaluation subject. This helps to provide students with more comprehensive and objective evaluation results.

8. Conclusion

Middle school teaching methods have an important influence on the cultivation of students' critical thinking and problem-solving ability. Through innovative teaching methods such as enlightening teaching methods and problem-centered teaching, students can actively explore, think and ask questions under the guidance of teachers, so as to cultivate and develop critical thinking and problem-solving abilities. In addition, the application of educational technology also provides students with more resources and tools to stimulate their interest in learning and initiative, and promote the development of their critical thinking and problem-solving skills. By implementing innovative teaching methods such as enlightening teaching methods, problem center teaching and educational technology application, students' interest and initiative in learning can be stimulated, and their critical thinking and problem solving ability can be improved. Teachers, schools and students all need to work together to provide support and conditions for the effective implementation of teaching methods, so as to cultivate middle school students with critical thinking and problem solving skills, and to lay a solid foundation for their future study and life.

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