

The exploration of mixed teaching mode of critical thinking training for college students

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Abstract: With the development and change of educational mode, blended teaching, as a new educational mode, gradually occupies an important position in higher education. Especially in the aspect of cultivating college students' critical thinking, blended teaching mode not only breaks through the limitation of traditional teaching mode, but also provides wide space and new opportunities for the training of critical thinking. The purpose of this paper is to explore the application of hybrid teaching model in critical thinking training, and to analyze its theoretical background, advantages, challenges and implementation strategies. Through literature review and case analysis, how to optimize the interaction and feedback mechanism in practical teaching, implement effective evaluation of learning results, and puts forward corresponding suggestions to improve teaching.

1. Introduction

With the rapid change of the global educational environment and the wide application of information technology, the traditional teaching mode is facing more and more serious challenges, especially in cultivating critical thinking of college students. Critical thinking, as one of the core qualities of the 21st century, is not only an important reflection of students' academic ability, but also a key ability for students to adapt to society and solve complex problems. Traditional teaching methods tend to focus only on the teaching of knowledge and neglect the cultivation of students' thinking ability, which makes the improvement of critical thinking in many education systems obviously inadequate. In order to meet this challenge, blended teaching model emerged. The combination of online learning and offline classes has broken through the space-time limitations of traditional teaching and provides new possibilities for the cultivation of critical thinking.

2. Theoretical framework and background of blended teaching mode

2.1. Definition and characteristics of blended teaching mode

Blended teaching mode is an innovative teaching method combining traditional classroom instruction with modern information technology. At its core, it offers a more flexible and diversified learning experience through a combination of online and offline learning. This pattern is not only a simple "online plus offline" superposition, but also a process of deep integration. Through organic design and rational structural adjustment, classroom learning and autonomous learning activities

complement and reinforce each other, ultimately achieving the dual purpose of knowledge transfer and ability cultivation^[1]. The characteristic of hybrid teaching mode is its flexibility and adaptability. Unlike traditional monoculture, blended teaching allows students to adjust to their personal schedules and learning pace. This highly personalized learning path greatly improves students' learning initiative and engagement. Blended teaching focuses on teacher-student interaction and the construction of learning communities. Online teaching platforms provide students with the opportunity to interact anytime and anywhere, allowing teachers to tailor content and methods in real time to students' needs and feedback. The blended teaching mode greatly enriches the content and form of learning. Through video lectures, online discussions, case studies, simulation experiments and other learning resources and activities, not only meet the needs of students with different learning styles, but also improve the depth and breadth of learning. The evaluation methods of mixed teaching also presents the characteristic of diversity, not only limited to traditional evaluation, but also pays more attention to process evaluation, such as students' learning logs, interactive discussion, project assignments, etc.. This assessment method helps to examine students' critical thinking, problem-solving and cooperation skills in a comprehensive manner.

2.2. Advantages and challenges of blended teaching mode

As an important innovation in modern education, blended teaching mode has been widely used in the world with its unique advantages of combining online and offline. However, this teaching mode, while achieving remarkable teaching results, also faces certain challenges, which deserve further discussion and reflection. From the vantage point, hybrid teaching mode maximizes the flexibility of online learning and the interactive nature of offline teaching, providing students with a more diversified and personalized learning environment^[2]. Students can access learning resources through online platforms at any time outside of a specified time and place, greatly increasing their initiative and efficiency. At the same time, the online platform's diverse features such as video explanation, discussion forums and instant feedback allow students to receive personalized instruction and real-time interactive feedback while learning freely, deepening their understanding and mastery of knowledge. The blended teaching mode also provides more teaching space and possibilities for teachers. Teachers can not only impart basic knowledge through face-to-face instruction, but also expand the depth of students' learning through online resources, and further develop students' critical thinking and independent thinking skills.

Although the blended teaching model presents many advantages, the challenges in its implementation cannot be ignored. The construction and maintenance of technical infrastructure is a problem that cannot be ignored, especially in the educational environment of some developing countries, students and teachers may face the shortage of technical equipment, network connection and other resources, which directly affects the smooth progress of blended teaching. Teachers' teaching design and ability will also encounter challenges in this mode. Blended teaching requires teachers to have strong technology application ability and curriculum design ability. Teachers not only need to be able to handle offline classroom teaching, but also need to have good online teaching design and management ability, which is a new challenge for teachers in the traditional teaching mode. Students' self-management ability and learning habits are also key factors in the effectiveness of blended teaching mode. Due to the high liberalization of learning time and space, some students may lack enough self-discipline to effectively plan learning progress and carry out deep learning, which will affect the learning effect.

2.3. Research status of blended teaching at home and abroad

Since its birth, the hybrid teaching model has been paid more and more attention by education researchers all over the world, especially under the background of the rapid development of internet technology, the research on its theoretical and practical application has also shown a trend of diversification and deepening. The study of hybrid teaching in foreign countries started early, especially in developed countries such as the United States, Europe and Australia, and has formed a mature hybrid teaching system^[3]. From the perspective of theoretical research, foreign scholars generally analyze blended teaching from multiple aspects such as learning theory, educational technology and instructional design. For example, American scholars have proposed that blended teaching is not only a simple superposition of teaching forms, but a holistic reconstruction based on learners' needs and learning environment. It relies on the support of technological tools and promotes students' personalized learning path and deep cognitive process through the deep integration of online learning and offline interaction. Australian scholars start from the relationship between learning motivation and learning achievement, and discuss how blended teaching mode can enhance students' learning motivation by enhancing their sense of participation and interaction, so as to effectively promote the improvement of academic achievement. In addition, a large number of foreign studies also focus on the effectiveness assessment of blended teaching, especially how to use a variety of assessment methods, such as peer review, online testing, self-assessment, etc., to conduct multidimensional and all-round consideration of students' learning outcomes.

Compared with other countries, the research on hybrid teaching mode in China started late, but with the wide application of information technology in education in recent years, the related research has been gradually strengthened. Domestic scholars usually discuss the theoretical basis and practical mode of hybrid teaching from the perspectives of education technology, teaching reform and curriculum construction. For example, it has been suggested that hybrid teaching can not only break the time and space restrictions of traditional classroom teaching, but also broaden students' learning horizons and practical opportunities through online learning platforms. Domestic research on blended teaching pays more attention to the application of technical means and the integration of teaching resources, especially in higher education and vocational education. Many colleges and universities are actively applying blended teaching mode in their courses and making efforts to combine modern education concepts such as large-scale online open courses and flipping classes with scientific and technological means to carry out teaching reform. However, domestic research still faces some challenges, especially in the practice of hybrid teaching mode. Due to the lack of systematic teaching design and evaluation system in some colleges and universities, the connection between online and offline teaching is not close enough, and students' learning experience and effect are not significantly improved. Due to the different technical conditions in different places, teachers' technical literacy varies widely, and the practical application effect of blended teaching varies widely. There is an urgent need to further optimize and perfect this teaching mode through in-depth theoretical discussion and practical summary.

3. Connotation and educational significance of critical thinking

3.1. Definition and characteristics of critical thinking

Critical thinking, as a particularly important ability in the field of education today, has long gone beyond simple acceptance and memorization of knowledge, and has developed into a cognitive process of deep thinking, rational analysis, and reflection on the views of oneself and others. It is not limited to superficial understanding of information, but requires individuals to comprehensively evaluate problems from multiple perspectives, raise reasonable questions, identify potential

assumptions and biases, and make independent and logical judgments on this basis^[4]. The core characteristics of critical thinking can be dissected from several dimensions. It is highly reflective, which means that when facing any opinion or information, the individual does not only stay at the level of acceptance, but carries out in-depth reflection and re-evaluation through the examination of existing opinions. This feature enables students to develop the habit of questioning and thinking while acquiring knowledge, rather than blindly accepting everything. Critical thinking emphasizes logic and rigor, which requires individuals to reason and demonstrate not only on the basis of facts and evidence, but also to avoid the interference of emotion and prejudice. Therefore, critical thinking is often accompanied by a rigorous logical reasoning process and a clear sorting out of the relationship between different arguments, which makes the thinking process clearer and more orderly. Third, critical thinking is independent, which means that individuals can maintain their own judgment under the impact of diverse information and opinions, and make rational decisions that are not affected by external pressure in the context of diverse information. This feature is particularly important in today's information society, where information overload often makes it difficult for individuals to distinguish truth from falsehood, and independent thinking is key to helping people break through the flood of information and make informed choices.

3.2. The role of critical thinking in the development of college students

Critical thinking plays an important role in the overall development of college students. Cultivating students' ability of deep thinking and independent analysis is the core component of higher education, and also the necessary quality to adapt to the future society and improve students' comprehensive quality. On a cognitive level, critical thinking pushes students to go beyond superficial knowledge acceptance to the essence and root causes of problems. This way of thinking enables students to examine problems from multiple perspectives, break traditional thinking limitations, and conduct rational analysis and logical reasoning on complex realistic problems, rather than relying on simple intuition or emotional response^[5]. For example, in academic research, critical thinking prompts students not only to understand existing research results, but also to be able to question the assumptions and conclusions of these results, and to propose new hypotheses and theoretical frameworks, thereby promoting the innovation and development of knowledge. Critical thinking plays an important role in college students' social adaptability. In today's social environment of information explosion and diversified viewpoints, college students are faced with information impact and value collision from different fields and cultural backgrounds. Without critical thinking, students tend to fall into the blind acceptance of external information and go with the flow, and may even be misled by false information and extreme views. The cultivation of critical thinking can help students maintain independent judgment in the complicated information flow, distinguish truth from falsehoods, identify biases, and make more rational and responsible decisions. Another important role of critical thinking is reflected in the improvement of college students' personal ability. It not only promotes students' logical thinking ability, analytical ability and problem-solving ability, but also helps students cultivate the habit of self-reflection in daily life, so that they can grow in continuous reflection and revision. This ability to reflect on oneself is not only the cornerstone of academic research, but also the key to continuous improvement and adaptation to change in one's career. More importantly, the cultivation of critical thinking contributes to the formation of students' sense of social responsibility and citizenship.

3.3. Challenges and strategies of critical thinking education

Critical thinking education, as the core element of cultivating students' independent thinking and rational judgment, has gradually gained attention in theory and practice, but it faces many

challenges in practice. The most prominent problem lies in the deep roots of the traditional education model, which usually focuses on the imparting of knowledge and the training of skills, while the cultivation of critical thinking is relatively neglected. Traditional teaching often focuses on students' memory and imitation, but lacks the active stimulation and guidance of students' critical thinking ability, which makes students more inclined to rely on intuition or inertial thinking rather than in-depth analysis and reflection when facing complex problems. The educational concept and ability of teachers also play a crucial role in the education of critical thinking. However, in reality, many teachers' teaching methods still remain in the mode of lecturing and inculcating, lacking sufficient teaching strategies to encourage students' questioning spirit and critical thinking. For example, many teachers tend to overemphasize standard answers in class and ignore students' personalized thinking paths, which not only suppresses students' innovative consciousness, but also makes it difficult for students to cultivate the ability of independent judgment and rational analysis. Thirdly, students' self-management and learning motivation are also a major challenge in critical thinking education. Critical thinking requires students to have strong active learning ability, self-reflection ability and high-level learning motivation. However, in the fast-paced and fragmented information environment, many students find it difficult to concentrate on deep thinking and often rely on shallow information intake and quick response, and lack of attention to the depth of thinking and critical reflection. Especially in today's popularization of the Internet, the phenomenon of information flooding and fragmentation is more serious, and students are easy to fall into an inefficient and superficial state of learning, unable to stimulate their profound discussion and criticism of knowledge.

In response to the above challenges, the strategy of critical thinking education should adopt various countermeasures. Educators should break the traditional teaching framework, take the cultivation of critical thinking as an important part of teaching, encourage students to question existing ideas and theories, and stimulate their desire for inquiry and critical spirit. Through case studies, group discussions, and reflective writing, teachers can guide students to participate in practical thinking and discussion, encourage them to examine problems from different perspectives, and cultivate their critical analysis ability in the process. Teachers' teaching methods and concepts need to keep pace with The Times and adopt more open and interactive teaching forms, such as flipped classroom and project-based learning, so as to stimulate students' enthusiasm and autonomy. In this teaching mode, teachers are not only the imparts of knowledge, but also the guides and promoters of students' critical thinking, helping students to think from multiple perspectives, and cultivating their independent judgment and critical ability.

4. Application of mixed teaching mode in the cultivation of critical thinking

4.1. Teaching design integrating inside and outside the classroom

Under the framework of blended teaching mode, organic integration inside and outside the classroom is not only the core of teaching method innovation, but also an effective way to cultivate critical thinking. Traditional classroom teaching is often limited by time and space. It focuses more on knowledge imparts and less on students' critical thinking training. By breaking this limitation and making use of the flexibility of the online platform and the interaction of the offline classroom, the blended teaching mode creates a multi-dimensional learning space, thus effectively promoting the development of students' critical thinking. The teaching design integrating inside and outside the classroom emphasizes the dual parallel of knowledge imparting and thinking training. In the traditional classroom, teachers usually assume the role of "knowledge imparts", teaching activities are mainly lecturing, students are often in a passive state of acceptance. However, in the blended teaching mode, classroom time is no longer a single "explanation time", and teachers can make

students complete the preliminary learning of knowledge independently after class by presetting online learning modules (such as video lectures, interactive exercises, etc.), so as to make room for in-depth discussion and critical thinking training in class. The teaching focus in class shifts to analysis and speculation. Teachers guide students to conduct group discussion, case analysis or debate around practical problems, encourage students to critically evaluate and reflect on problems from different perspectives, and help them move from the surface of cognition to deeper logical thinking and reasoning judgment.

The introduction of online learning platform makes students' learning no longer limited to a single classroom environment, but can independently conduct deep learning and reflection outside of class, further strengthening the cultivation of critical thinking. Through the online platform, students can access learning resources at any time, conduct self-tests, participate in peer reviews, etc., to further promote the internalization and critical examination of knowledge. Especially when dealing with complex problems or multiple viewpoints, the various information and feedback from multiple perspectives obtained by students through online platforms can help them analyze problems more comprehensively and identify potential assumptions and biases. This extra-curricular learning activity is designed not only to help students develop critical thinking skills in independent learning, but also to develop critical analysis and reflection in different contexts through a variety of online interactions such as blog writing, discussion forums, and peer review.

This kind of teaching design integrating inside and outside the classroom also faces some challenges in the implementation process. One of the keys to the success of blended teaching mode is how to effectively integrate online and offline teaching content and ensure that the two can seamlessly connect in time and space. If the content of online learning is disconnected from the schedule of classroom teaching, or if there is a conflict in the schedule, the student's learning experience and effectiveness will be greatly reduced. How to stimulate students' self-drive and critical thinking initiative outside the classroom is also a difficult problem to overcome. When faced with open online learning tasks, many students may fall into a superficial learning state, failing to conduct deep reflection and critical analysis. When designing blended teaching, teachers need to pay special attention to how to stimulate students' active thinking and deep participation to the greatest extent through scientific teaching arrangement, clear task guidance and reasonable feedback mechanism. The teaching design integrated inside and outside the classroom provides a very rich practical field for the cultivation of critical thinking, which can effectively broaden the thinking dimension of students, improve their ability to analyze and solve problems, and cultivate their habits and skills of independent thinking.

4.2. Optimization of interaction and feedback mechanism

In blended teaching mode, the optimization of interaction and feedback mechanism is one of the key factors to improve the training effect of critical thinking. In the traditional teaching mode, the interaction is often limited to the dialogue between teachers and students in the classroom. This relatively one-way mode of communication is hardly conducive to the deepening of students' critical thinking. In the blended teaching mode, through the organic combination of online and offline interaction, students are provided with a broader platform for interaction, not only breaking the space and time constraints, but also providing more dimensional support for the cultivation of critical thinking. The introduction of online learning platform enables students to interact with classmates in a non-face-to-face situation. With the help of discussion areas, forums, question-and-answer systems and other functions, students can express their own views, share learning experiences, or question and reflect on others' views anytime and anywhere. Through this

online interaction, students can not only learn new knowledge from the perspective of others and challenge their own inherent cognition, but also gradually form their own judgment standards and critical thinking modes through debate and dialogue.

At the same time, the feedback mechanism in blended teaching is particularly important. Traditional feedback is often limited to teachers' regular evaluation of students through exams or assignments, and usually focuses on scores and grades, lacking in-depth analysis of students' thinking processes. Under the blended teaching mode, teachers can provide real-time and personalized feedback in a variety of ways, which not only helps students correct mistakes in time during the learning process, but also guides them to reflect and improve at the level of thinking. Teachers can use online platforms to provide immediate feedback, such as through automated testing systems, online homework correction, peer evaluation, etc., to timely understand students' weak points in understanding and applying knowledge, and help students improve through personalized guidance. In addition, teachers can also arrange more interactive sessions in class, such as group discussion, role play or problem solving, so that students can get immediate feedback in the activities, so as to better identify their thinking blind spots and logical loopholes. Through this interaction and feedback, students are able to continuously challenge themselves in practice, revise their views, and develop the depth and breadth of critical thinking.

In order to effectively optimize the interaction and feedback mechanism, it is not enough to rely only on technical tools and platforms. The key lies in how to design reasonable teaching strategies and links, so that interaction and feedback are not only on the surface, but really promote the transformation and improvement of students' thinking. Teachers need to carefully design different levels and forms of interactive activities according to students' learning status, thinking level and specific needs to ensure that each student can get sufficient thinking inspiration and feedback in the participation. At the same time, the diversity and complexity of teaching content also require teachers to have keen insight and flexible adaptability, so as to timely adjust teaching strategies according to students' feedback and promote the development of students' critical thinking. The optimization of interaction and feedback mechanism not only injects vitality into the blended teaching mode, but also provides effective support for the cultivation of critical thinking, which has become one of the core elements of educational reform and innovation.

4.3. Assessment and improvement of learning outcomes

Under the blended teaching model, the assessment and improvement of learning outcomes is not only an important part of the teaching process, but also a core component of critical thinking training. The traditional assessment mode usually focuses on the detection of students' knowledge mastery, often focusing on standardized exams and final scores, and ignores the true performance of students in the depth of thinking, problem analysis ability and innovative thinking. However, the cultivation of critical thinking requires that the assessment method can comprehensively and dynamically reflect the development of students' ability beyond knowledge acquisition, especially in their ability to analyze, judge and innovate. Therefore, the evaluation system of blended teaching mode needs to be optimized in a diversified and hierarchical framework in order to better promote the deepening of critical thinking. The assessment of learning results should be changed from the traditional single examination form to the combination of process assessment and comprehensive assessment. This way of assessment is not limited to the quantitative evaluation of students' final grades, but pays more attention to the transformation and growth of students' thinking mode in the whole learning process. For example, teachers can learn about students' progress in thinking and expression in real time through interactive tasks in online platforms, blog writing, peer reviews, etc. This assessment can not only reflect students' understanding of knowledge, but also effectively test

whether they have the key characteristics of critical thinking, such as analytical skills, logical reasoning skills, and the ability to accommodate and reflect on diverse viewpoints. In addition, through the performance of students in class discussion, deep thinking of problems and response to debates, teachers can assess students' critical thinking level in a more comprehensive way, and then put forward targeted suggestions for improvement. The evaluation feedback mechanism should be dynamic and personalized to achieve effective guidance and improvement of students' learning outcomes. Different from the traditional final assessment, blended teaching emphasizes the timeliness and continuity of process feedback. Teachers should not only pay attention to students' knowledge mastery, but also pay attention to the quality and depth of feedback. Instant feedback through online platforms can not only help students identify the weak links in learning in time, but also encourage students to self-correct and adjust in the process of critical thinking training. For example, according to the situation of students' online discussion, teachers can put forward targeted reflective questions to students, prompting them to further explore the multiple aspects of the problem and deepen the breadth and depth of their thinking. Through this real-time, interactive feedback mechanism, students can constantly adjust their thinking patterns and improve their critical thinking skills during the learning process. To achieve effective assessment and improvement, teachers and students cannot leave the joint efforts. Teachers should not only be able to design a variety of evaluation methods, but also be able to dynamically adjust teaching content and methods based on student feedback. Students should keep an open mind in the evaluation process, take an active part in reflection and self-evaluation, and dare to face their own blind spots and shortcomings. Through this two-way interaction and feedback mechanism, the evaluation of learning outcomes not only better reflects the growth of students' critical thinking, but also promotes the continuous improvement and optimization of teaching content and methods. The evaluation and improvement of learning achievement in hybrid teaching mode is not only a measure of students' learning outcomes, but also a key driving force for the deepening critical thinking education.

5. Conclusions

Through the systematic analysis of the application of mixed teaching mode in the cultivation of critical thinking, this paper reveals the great potential and practical value of this new teaching mode in modern education. In the specific teaching design, the hybrid mode can not only broaden the learning space of students through the effective integration of inside and outside the classroom, but also provide more dimensional support for the cultivation of critical thinking. By optimizing the interaction and feedback mechanism, teachers can understand students' learning progress in real time, give timely targeted guidance, and further promote the improvement of students' critical thinking. In addition, dynamic assessment of learning outcomes can not only help students deepen their self-cognition, but also help teachers adjust their strategies in the teaching process and improve teaching results. However, the implementation of this model still faces challenges in technical support, teacher competence and student self-management, and solving these problems will be the key to promote the effective application of blended teaching model. In the future, with the continuous progress of educational technology and the further renewal of teaching concepts, the hybrid teaching model will play a greater role in the training of critical thinking and provide a new impetus for the reform and development of higher education.

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