

Exploration on the Feasibility of Integrating Ideological and Political Education Elements into Higher Vocational Mathematics Courses

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Abstract: The stage of vocational education, during which the students gradually develop social roles, is key to their growth. Thus, teachers should realize the importance of ideological and political education in higher vocational mathematics courses, continuously exploring the feasibility of the courses, in order to foster virtue, cultivate talents and meanwhile combine value guidance, knowledge imparting, and competence cultivation. This allows students, by learning, to develop the ability to master the laws of development, understand principles, enrich knowledge, and expand horizons, consequently shaping their personalities. The integration of ideological and political elements into higher vocational mathematics teaching is of great significance in the growth of students' life, mathematics learning and career development. Also, the implementation of ideological and political education in higher vocational mathematics has unique advantages in the aspects of taking history as a mirror, inspiring talents, and understanding facts. In order to improve the timeliness of such integration, it is proposed to establish and enrich the dynamic resource base of ideological and political elements, lay out corresponding ideological and political elements along the main line of mathematics teaching, and expand the coverage of ideological and political education in higher vocational mathematics curriculum.

1. Introduction

Fostering moral integrity and cultivating talents is the fundamental task of education in China. Prioritizing moral education is a tradition that has been inherited from China's educational culture for thousands of years. General Secretary the leader of our country emphasized [1], at the National Conference on Ideological and Political Work in Colleges and Universities, that we should make good use of classroom teaching as the main channel, ensuring that various courses align with ideological and political theory courses, thereby creating a synergistic effect. As a basic course in vocational colleges, vocational mathematics is a course that emphasizes both thinking and practicality. It not only plays a role in cultivating creative thinking to serve students' learning of professional courses but also guides students to pursue truth and beauty in the process of learning mathematics. Therefore, integrating ideological and political education into vocational mathematics

courses is of great significance.

Currently, universities across the country are vigorously implementing ideological and political education in their curricula. Mathematics courses contain rich knowledge and humanistic qualities. Based on the "Guiding Outline for the Construction of Ideological and Political Education in Higher Education Institutions" issued by the Ministry of Education, this article explores and analyzes the importance and feasibility of integrating ideological and political elements into higher vocational mathematics courses, striving to harmoniously integrate the imparting of mathematical knowledge, the cultivation of learning abilities, and the correct shaping of values.

2. The Importance of Ideological and Political Education in Higher Vocational Mathematics Courses

2.1 The Focus on Cultivating Moral Character through Education and Deepening the Value Orientation of Mathematics Courses

"The best plan for one year is to plant grain; the best plan for ten years is to plant trees; the best plan for a lifetime is to nurture people." Education is the foundation of a nation's existence and the basis for its strength. The competition among nations today is a competition of economic strength and technological level, ultimately boiling down to the competition of the quality of workers and the level of talent. Vocational education, as a critical period for talent cultivation, is an important stage for individuals to transition from teenage students to adult members of society. Therefore, it should adhere to the principle of prioritizing talent cultivation, with moral education taking the lead, and emphasizing all five aspects of education simultaneously.

Among the numerous basic courses offered in vocational colleges, traditional mathematics courses pose a significant learning challenge for students and are not courses that students particularly like. The author believes that this is largely due to students' weak mathematical foundation, teachers' lack of innovation in teaching, and students' lack of enthusiasm for learning. However, vocational mathematics courses bear the responsibility of constructing students' knowledge systems, cultivating their logical thinking, computational skills, image and spatial thinking, and creative thinking abilities, and teaching them to distinguish between truth and falsehood and make critical choices. Vocational mathematics is also a tool-oriented discipline that emphasizes serving professional courses when constructing the curriculum system, focusing on professional applications during the teaching process, and closely linking with real life. The value of mathematics lies in its integration of knowledge, ability, and attitude. It not only involves learning knowledge and skills but also encompasses activity experiences, emotional projection, value judgments, and choices in students' learning, life, and practical situations, helping students build a framework that adapts to contemporary society, fosters a lifelong learning concept, and achieves comprehensive and sustainable development. Therefore, we must attach importance to effectively carrying out ideological and political education in mathematics courses. We should fully tap into the rich ideological education materials in mathematics, organize and study elements that are suitable for the development of vocational school students, thereby forming a distinctive vocational mathematics curriculum that truly achieves individualized teaching and cultivates moral character [2].

2.2 The Enhancement of the Awareness of Ideological and Political Education through Mathematics to Comprehensively Shape Students' Personality

Students in vocational schools have undergone streaming based on their performance in the middle school entrance examination, and they do not have an advantage in academic performance.

In fact, many of them have serious academic bias, which is largely due to their strained relationship with their former teachers. In a confrontational teacher-student relationship, moral education is often lacking. Many teachers in primary and secondary schools prioritize academic performance as the primary focus, neglecting the shaping of students' character. After entering vocational schools, students tend to have a lax attitude towards learning, believing that vocational schools are only for learning a specific skill, and that mathematics courses are not important. Therefore, they lose interest and motivation in learning this basic course. Mathematics teachers in vocational colleges should reflect on this, clarify their talent cultivation goals, and take "cultivating well-rounded individuals" as the ultimate educational goal. Teachers should establish a clear and comprehensive mathematics teaching goal system that targets the personality development characteristics and needs of students at different stages, based on enhancing students' learning ability, thinking ability, self-management ability, and teamwork ability, with human development needs as the guiding principle. Teachers should abandon traditional teaching modes, fully understand the ideological and political connotation of the curriculum, and strive to enhance ideological and political education awareness. Mathematics teachers should grasp the pulse, understand what students are thinking, and objectively and fairly evaluate each student. While imparting mathematical knowledge to students, teachers themselves are also undergoing the baptism of ideological and political education. Through continuous practice in classroom teaching and the continuous leap of their own values, they strive to become "four-good teachers"[3] with ideals and beliefs, moral sentiments, solid knowledge, and a heart of benevolence.

Facing unexpected educational issues in classroom teaching, teachers respond calmly and proactively, not only resolving the crisis but also gaining the trust of students. Maintaining a relaxed and harmonious relationship between teachers and students is a prerequisite for teachers to carry out ideological and political education in courses. Vocational school students are not yet psychologically mature, and their outlook on life, worldview, and values have not been fully established. At this stage, they need more guidance from teachers. If they often hear teachers' evaluations such as "you are the worst generation of students I have ever taught," this negative evaluation often brings negative psychological implications, and students will lose the motivation to realize their self-worth. The correct way can be: "you are the most promising kids I have ever seen." Vocational school students need more affirmation and understanding. Therefore, helping students establish self-confidence and guiding them with patience and kindness are the foundation for comprehensively shaping students' personality. In mathematics teaching, student management, and other aspects, teachers should actively explore, seize opportunities, imbue ideological and political education, and consciously guide students to cultivate correct core values.

2.3 The Improvement of the Pattern of Mathematical Education to Perceive the Spirit of Craftsmanship and Innovation

As a manufacturing giant, China needs a large number of skilled professionals. Facing the complex international situation today, especially in high-tech industries, international competition is extremely fierce. Taking the "Huawei" incident as an example, Western countries are vigorously hindering China's development on the chip issue, posing great challenges to various fields in China. Vocational education is a crucial stage in cultivating qualified talents needed by society. It cultivates challengers who will step into society and undergo testing. Mathematics teachers in vocational schools, in the new era, should actively reform teaching models, pay attention to students' learning status and learning process, stimulate students' curiosity and desire for knowledge, and guide them to actively explore and practice around problems with students being the focus. We should organically integrate the scientific spirit of great mathematicians, mathematical literacy, and

the innovative spirit of forging ahead, and cultivate comprehensive talents with a craftsman spirit.

The ultimate goal of vocational mathematics courses is to unify the impartation of mathematical knowledge with the realization of self-worth. With the ideological and political elements hidden within the mathematics curriculum fully explored, and the "main force" of the teaching team, the "main battlefield" of curriculum construction, as well as the "main channel" of classroom teaching firmly grasped, vocational school mathematics teachers are encouraged to shoulder their educational responsibilities, maintain their roles as "guardians of the channel" and "cultivators of the responsibility field". This ensures that vocational mathematics courses and ideological and political courses move in the same direction, unifying explicit cultural education with implicit ideological and political education, forming a synergistic effect, and establishing a comprehensive educational framework for vocational mathematics courses that covers the entire process and all aspects [4].

3. The Feasibility of "Ideological and Political Education through Courses" in Higher Vocational Mathematics

The Party and the country attach great importance to ideological and political education in vocational education courses, requiring that ideological and political education be integrated throughout the talent cultivation system, the construction of ideological and political education in courses be actively explored, the educational role of mathematics courses be fully leveraged, and the quality of talent cultivation in vocational education be comprehensively improved.

3.1 Full Exploration of the Elements Objectively Existing in Moral Education in Mathematics Courses

Mathematics originated from early human productive labor activities and was also known as arithmetic in ancient China. Over the past few centuries, mathematics has undergone significant development. The mathematics curriculum has gradually accumulated, reformed, and improved throughout history, and has gradually formed a large number of moral education elements. In the past, we paid more attention to the teaching of knowledge points, believing that good teaching by teachers means that students can answer academic questions, often neglecting the integration of ideological education and humanistic education. As a result, mathematics classes overly focus on the teaching of skills to answer questions. As the difficulty increases, some children gradually fall behind, and fewer and fewer children listen carefully in class, leading to a deteriorating teaching effect in such classes. As mathematics teachers in vocational schools, we should change the original teaching mode and carry out ideological and political education in mathematics courses with the times. By collecting materials, repeatedly studying, and discussing with each other, we can imbue patriotism and love for socialism. By telling stories of famous people, we can cultivate humanistic qualities and moral cultivation, thereby systematically carrying out education on socialism with Chinese characteristics, the Chinese Dream, core socialist values, excellent traditional Chinese culture, rule of law, labor education, and mental health education. To achieve this, firstly, we should cultivate students' innovative thinking, problem discovery, and question raising---"I reflect on myself three times a day" and "when a gentleman is learned and refers to himself, he knows and does nothing wrong"; secondly, we should teach students to become masters of learning and possess the ability to think independently; thirdly, we should cooperate and communicate to form attitudes and qualities that are suitable for future work and life.

3.2 Students' Expectations for Their Career Development and the Realization of Their Self-worth

When paying attention to students' learning and living, we found that students' learning efficiency depends on their learning motivation. Students in vocational colleges have weaker learning habits and abilities, and they often feel fearful of difficulties and a sense of self-doubt, making them prone to giving up when faced with challenges. I once had private conversations with several students who often slept in class. When discussing the reasons for not listening carefully in class, the students said that they had listened carefully before, but they only understood part of the content and didn't try to ask the teacher for help. As a result, they became less proficient in their studies and gradually developed a habit of sleeping in class. This may be the real reason why many students are disinterested in learning. A survey questionnaire on "mathematics learning motivation and ideological and political needs" was conducted among vocational college students. From the perspective of learning motivation and purpose, 37% of students said they studied for their parents, 95% wanted to find a high-paying job, and 64% longed to be recognized by teachers and classmates. From the perspective of learning ability and attitude, 78% of students lacked the ability to view problems from a developmental perspective, 43% had a natural fear of mathematics, and 66% were prone to psychological imbalance. It can be seen that vocational college students lack the ability to view problems from a developmental perspective, long for recognition from others, but lack confidence in learning mathematics and are prone to giving up; they want to improve their grades, but they are also afraid of difficulties and prone to psychological imbalance; they want to get a good job, but they cannot persist in striving hard. Therefore, combining ideological and political education with talent training goals and characteristics in vocational college mathematics courses can help students achieve self-worth and character shaping from the perspectives of Marxist philosophy, patriotism, personal career planning, achievement fulfillment, and physical and mental health. The ideological and political education incentives [5] for learning motivation can be summarized as follows:

- (1) Guide students to clarify the purpose and significance of learning, and establish a suitable and correct outlook on learning and philosophy;
- (2) Actively create ideological-political questions and context, implement heuristic teaching methods, and cultivate students' innovative consciousness and capabilities;
- (3) Stimulate students' sense of success in learning, sense of identity, and good teamwork capabilities;
- (4) Leverage students' competitive spirit to appropriately establish a healthy competition mechanism;
- (5) Cultivate students' healthy mindset in pursuit of a better life in the future;
- (6) Correctly direct the attribution of results, strengthen beliefs, and encourage students to continue their efforts. (See Figure 1 below)

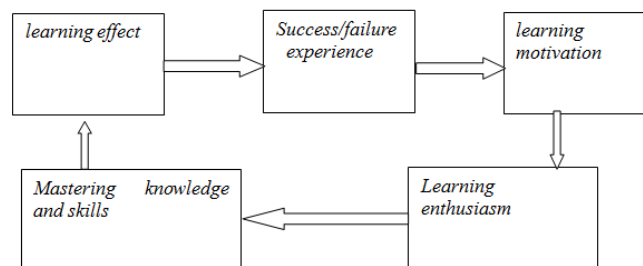


Figure 1: Schematic diagram illustrating the relationship between learning motivation and learning outcomes

3.3 Effective Application and Practice of Ideological and Political Education in Mathematics Courses Using the Internet

With the rapid development of online information-based teaching, the available teaching modes and methods are becoming increasingly diverse, ranging from flipped classrooms to blended online and offline teaching. In vocational colleges, students are allowed to use mobile phones to assist their learning in classroom teaching, and teachers can assign various learning tasks to students through learning platforms (such as Chao Xing Learning and Blue Ink Cloud Class). There are a large number of inspirational stories of Chinese and Western mathematicians and the spirit of advocating science in vocational mathematics textbooks, as well as many extracurricular reading materials. In previous teaching, we often brushed them aside, neglecting their function of ideological-political education. Therefore, we can make good use of the developed and convenient network to let students search online with their mobile phones to discover the philosophy contained in learning, thereby enhancing students' ideological stage. Under such a teaching mode, teachers and students are highly involved. Students not only enrich their knowledge and learn content that cannot be learned from books, but also become masters of learning, unconsciously developing the habit of independent exploration and teamwork, and thus achieving the original intention of ability cultivation.

Under the background of "Internet Plus" [6], the evaluation methods of teachers and students on teaching have also undergone significant changes, with a more diversified and varied evaluation system. Through the Internet, students are more willing to provide genuine feedback, which helps teachers to carry out targeted reforms in the 'Three-teaching aspects' [7] of higher vocational mathematics courses.

3.4 Supplementary Education Provided by Student Clubs of Mathematics outside Classroom Teaching

The curriculum standards and teaching construction of higher vocational mathematics focus on acquiring necessary basic knowledge and skills, understanding the underlying mathematical thinking, experiencing the process of discovery and creation in mathematics through independent exploration, striving to enhance innovation consciousness and ability, improving interest in mathematics learning and confidence in mastering mathematics, forming good study habits, recognizing the application value and cultural value of students, and further establishing a dialectical materialist worldview.

The establishment of the extracurricular math club [8] serves as an extension and expansion of classroom teaching. Compared to classroom instruction, the activities of the extracurricular student club are more casual, allowing students to participate freely and more easily, therefore achieving the effect of ideological education. For instance, students with a strong foundation in mathematics who wish to learn more advanced mathematical knowledge and problem-solving methods will be arranged by the math club to participate in special math competitions. Through regularly held school-wide math competitions, outstanding contestants are selected to participate in various math competitions at provincial and municipal levels (such as mathematical modeling competitions), allowing them to generate the feeling of "one mountain is higher than another" through mutual learning, thereby stimulating their sense of competition. Another example is that for students with a literary bent, we will arrange special talks on mathematical culture, presented through mathematical history, biographies of figures, great deeds, and outstanding contributions, and will provide spiritual nourishment for students. Members of the math club can also voluntarily help "students with learning difficulties" in their classes, proactively assisting them in solving doubts and difficulties in learning and playing a positive role in uniting classmates. Therefore, it is necessary and meaningful

to carry out extracurricular student math club activities well.

4. Case Reflections of "Ideological and Political Education through Courses" in Higher Vocational Mathematics

Mathematics is often referred to as the "language of the universe". The underlying cognition and understanding of the world in human society often rely on a concise yet profound mathematical logic. Mathematics is not just a pile of boring numbers and formulas, but can serve as an effective means of ideological and political education.

4.1 Patriotism Education

The beginning of higher vocational mathematics is "set theory". When explaining the concepts of sets and elements, we often use the commands of instructors during military training as an example: the class is a set, and each student in the class is an element, which in turn form the set. After more than ten days of military training for freshmen, students have a strong sense of class honor and a high enthusiasm for patriotism and strengthening the military. Teachers can appropriately combine the relationship between the country and citizens, as well as the relationship between the army and soldiers, and play short videos of our country's magnificent military parade. Watching each "formation march in unison" gives students a sensory impact and gains their recognition. The classroom is filled with a patriotic atmosphere of strengthening the country and the military, resulting in significant educational effects.

4.2 Integrity Education

With the rapid development of the Internet, telecommunication fraud has emerged in an endless stream, and the means of fraud have become increasingly sophisticated, exploiting people's greed to deceive them. Taking the 2022 football World Cup betting as an example, during the World Cup, many netizens would place bets on the outcomes of matches on betting platforms, and many students were also involved. New forms of fraud have emerged as a result. Below is a real case.

One day, a netizen received a text message claiming to offer free professional predictions for the upcoming match scores. The netizen dismissed the message as spam, but after the match ended, the predicted score turned out to be correct. After several more accurate predictions, the netizen became convinced. Then, another message arrived, suggesting placing a bet on a certain platform. Without hesitation, the netizen placed a large bet, but the outcome was obvious: he never received another text message.

In this case, the fraudsters cannot really predict the game score. They only used the knowledge of probability in mathematics. They sent mass text messages through the platform according to different scores. After one round, they again sent messages to those netizens who had received correct scores. They repeated this several times. After probability screening, there were always some people who fell for the trap. Through this case, teachers can effectively educate students that learning mathematics well can help them see through scams. They can also warn students that there is no free lunch in the world, and they should stay away from gambling and be honest.

4.3 Mathematical Culture and Scientific Spirit

Throughout the long history of our country, thousands of years, numerous great mathematicians and their valuable achievements and touching deeds have emerged. When teaching the concept of limits, one ancient Chinese mathematician who must be mentioned is Liu Hui from the Wei

Dynasty during the Three Kingdoms period. He is one of the founders of classical mathematics. In his book "Nine Chapters on the Mathematical Art," he proposed the "method of cutting circles," which provided precise formulas for calculating the area and circumference of a circle. By using a regular polygon inscribed in a circle to cut the circle, he calculated the value of pi to be 3.1416, leading the world by more than 1,000 years. Today, 1800 years later, on the stage of the second season of "The Strongest Brain," the 73-year-old Wu Guangren successfully recited pi to the 5,000th decimal place.

During teaching, we take the spirit of mathematicians who are well-known to students, and many "ordinary people" who strive for truth and advocate science, as the starting point to guide students to form a good learning attitude and the habit of thinking diligently. We also take the noble character and excellent qualities of mathematicians as a model to carry out the education goal of cultivating moral character and ability.

4.4 Mathematical Aesthetic Education and Gratitude Education

Mathematics originates from life. Crop circles refer to large patterns mysteriously formed in vast areas, primarily in wheat fields and rice paddies. Teachers can show these images during class to allow students to intuitively experience the beauty of mathematical geometric shapes in nature. The various shapes, complex and changeable, yet full of mystery, are deeply imprinted in the minds of children, thereby enhancing their learning interest and inspiring them to extend their independent learning. When teaching problems related to arithmetic progression, we can start with "rice paddy art". To celebrate the 100th anniversary of the Communist Party of China, artists created a large "100" figure in a vast rice paddy, with the number "1" being 100 meters wide. If we start from the leftmost side of the number "1" and insert a red flag every 6 meters, forming a row from near to far, will the last red flag be inserted at the rightmost end of the number "1"? How many red flags should be inserted in total? This problem not only solves the issue of arithmetic progression but also guides students to remember and appreciate the outstanding contributions of Yuan Longping. It teaches students that "In taking a mouthful of congee or rice you should bear in mind that its production is not easy", and students should start from themselves and cherish food.

5. Conclusion

Integrating ideological and political education into vocational high school mathematics courses is already moving rapidly forward, but there is still a need for continuous exploration, induction, feedback, and improvement in practical methods. Mathematics teachers should fully enhance their own ideological and political awareness, collect ideological and political elements through various channels, and optimize their application. They must not blindly apply methods without adaptation or pursue ideological and political education for its own sake. Instead, they should organically integrate basic mathematical knowledge with the essence of ideological and political education, promoting mutual enhancement, ultimately fulfilling the fundamental task of cultivating moral character and comprehensively shaping students' excellent qualities.

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