

# On the Infiltration of Mathematical Culture in Middle School Mathematics Teaching

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## Abstract

Mathematical culture has a long history, and the importance of mathematical culture is also mentioned in the curriculum standard. This paper first studies the current situation of ignoring students' interest, teachers' lack of mathematical culture, and unreasonable teaching evaluation in the infiltration of mathematical culture in middle school mathematics teaching. Finally, five infiltration strategies of mathematical culture in middle school mathematics teaching are given: infiltration should be combined with students' interest, teachers' own mathematical culture to promote the infiltration of mathematical culture, reasonable educational objectives, and educational evaluation to promote the infiltration of mathematical culture, multimedia to promote the infiltration of mathematical culture in mathematics teaching and accelerate the infiltration of mathematical culture in examination questions. Through these five strategies, it can help to improve students' mathematical culture and promote the cultivation of students' overall core literacy. It also contributes to the future education.

## Keywords

Middle school mathematics teaching, mathematical culture, penetration

In recent years, the ordinary high school mathematics curriculum standard<sup>1</sup> has mentioned that the continuous development of mathematical culture promotes the progress of human civilization. It affects mathematics teaching [1]. It can be seen that mathematics culture is gradually reflected in middle school mathematics teaching, but because traditional teaching does not pay attention to the influence of students' interest in learning, the lack of teachers' own mathematical culture ability, the influence of teaching objectives and teaching evaluation on teaching, these status quo are not conducive to the further penetration of mathematics culture into middle school mathematics teaching. Therefore, in order to improve this situation, teachers should try their best to infiltrate mathematics culture into mathematics classrooms according to the characteristics of mathematics culture, and pay attention to students' interest in mathematics in mathematics class, so as to promote the infiltration of mathematics culture in teaching and improve the efficiency of mathematics teaching.

## 1. The present situation of mathematics culture in middle school mathematics teaching

Mathematics culture has gradually entered middle school mathematics teaching, which is conducive to teachers' lectures, students' learning, and other advantages. However, there are still some problems worthy of our attention. There are the following aspects:

### 1.1 Ignoring students' interest affects the existence of mathematical culture

In traditional teaching, compared with quality education, exam-oriented education accounts for a large proportion of the overall education. The public believes that mathematics classes only teach the theorems, concepts, definitions, and so on in mathematics textbooks. It is also believed that mathematical knowledge is the only key part of mathematics learning and

that mathematical culture accounts for only a small part of the middle school mathematics teaching classroom. In this case, the mathematical culture can not be fully infiltrated into the mathematics classroom, and the interest of students in learning will not be improved naturally [2]. In middle school mathematics teaching, teachers generally explain the theoretical knowledge, then sort out the knowledge points of the examination, and then explain them to students carefully, teach students various mathematical problem-solving skills, and then practice repeatedly. In fact, they do not master the essence and connotation of knowledge. This process is mechanical so students have no interest in mathematics. Middle school students often have the motivation to learn in the face of things they are interested in. Learning interest is the source of learning. As educators, we can not ignore the influence of learning interest on the infiltration of mathematics culture into education. Interest is the driving force of students' learning and guides students to develop in the direction they expect. Therefore, teachers have relevant teaching tasks in each class, but they should take into account the cultivation of students' interest in learning while completing the teaching tasks [3].

### **1.2 Teachers' mathematical culture is insufficient**

The infiltration of mathematics culture has not been paid special attention to by middle school mathematics teachers, and the old teachers have not learned the systematic mathematics culture. Most of the young mathematics teachers are more or less subject to the resistance of various infiltration of mathematical culture [4]. For example, the infiltration of mathematical culture is not timely, or infiltrated but delayed the teaching of mathematics knowledge. And in the later teaching, it was suspected that the mathematical culture was not used in the examination, and did not interfere with the students' performance too much, so it was not implemented as well as expected. At the same time, teachers do not have leaders to lead. Teachers themselves lack the ability in this aspect and middle school teachers are busy with teaching, so they cannot really grasp the help of mathematics culture in mathematics teaching. Because the teacher's own mathematical culture is gradually accumulated for a long time, it is not formed overnight. Most teachers do not adhere to the spirit of accumulation and the ability to continuously study the advantages of mathematical culture in middle school mathematics teaching.

### **1.3 Teaching objectives and evaluation affect the status of mathematical culture in mathematics teaching**

Under the great pressure of employment in today's society, entering a higher school has become the ladder of employment and survival. Most people are influenced by traditional ideas. Only the phenomenon of fraction theory and nominal school theory are the learning objectives, and then they continue to attend remedial classes. There are also a very large number of parents' evaluations of teachers that have been stuck in the teachers can improve their children's performance. It is conceivable that mathematical culture will not be taken seriously in this case. Due to the lack of teachers' teaching time and the need to teach high performance as an assessment standard, most mathematics teachers can only impart a large amount of mathematical knowledge and carry out a single teaching evaluation on students. For the piece of mathematical culture, most teachers will leave it to students to read independently. Most teachers pay attention to the mathematical knowledge of each part of mathematics. This situation makes the importance of mathematical culture neglected in education. Ignoring the humanistic value of mathematical culture to students. Similarly, students are no longer guided to explore mathematical culture and mathematical thinking is also affected.

## **2. Penetration strategy of mathematics culture in middle school mathematics teaching**

In the current era of rapid development of science and technology, mathematical culture has entered all aspects of social production and life and has become an extremely important driving force for social development. Mathematics teachers should increase middle school students' understanding of mathematical culture in middle school mathematics teaching. In the infiltration of mathematical culture, students' understanding ability and learning ability can be greatly improved. However, in view of the lack of penetration of mathematical culture, we should increase the penetration of mathematical culture in middle school mathematics teaching. We should take the following measures:

### **2.1 Mathematical culture should be combined with the interests of students to penetrate**

Mathematical culture can be combined with students' interest, because interest is the best teacher, and combined with a mathematical culture of mathematics teaching can attract students. In this way, mathematics teaching will be more smooth and students will be more fruitful in mathematics. Explore the mysteries of mathematics in mathematical activities. Enhance the interest in mathematics. Mathematics teaching conveys some background knowledge through appropriateness. In the course of the arithmetic progression of mathematics teaching, the arithmetic teacher who introduced the mathematics prince Gauss gave a question to the students in the class: from 1 to 100. However, Gauss soon gave the correct answer:

5050, Gauss shows the talent of mathematics. This interesting story promotes the progress of mathematics teaching so that the insertion of mathematics culture in the relatively boring middle school mathematics teaching classroom can add a touch of interest. In middle school mathematics teaching, mathematics culture must include some interesting stories of mathematicians. Similarly, the more obscure cultural elements are contained in the relevant knowledge points of mathematics. The significance of mathematical culture for middle school mathematics teaching comes from the fact that some knowledge in middle school mathematics textbooks already has a mathematical culture.

## **2.2 Teachers' own mathematical culture promotes the infiltration of mathematical culture**

The middle school mathematics teachers have the idea of dealing with the examination, which is not correct. As teachers, they should change. Middle school mathematics teachers should constantly strengthen the study of mathematics history and mathematics culture knowledge to promote the professional development of teachers' teaching and help students master mathematics knowledge. Therefore, it is necessary to supplement and expand mathematics teachers' knowledge of mathematics history and mathematics culture [5]. As a middle school mathematics teacher, we should pay attention to our deep understanding of the relevant books in the field of mathematics. For example, the history of mathematics, and some interesting things about mathematicians, to broaden our horizons; as well as master higher mathematics, mathematical analysis, and other university books in the content and ideas to arm themselves. Only by forming a real sense of mathematical culture can we freely walk through the field of mathematics and lead students to understand the important connotations and thinking methods of mathematics. In teaching, we should combine the actual situation of students to develop intelligence while paying attention to the cultivation of students' non-intelligence factors, so that students can better improve their emotional and cognitive ability and improve their overall cultural literacy.

## **2.3 Reasonable educational goals and educational evaluation promote the infiltration of mathematical culture**

Mathematics teachers should not only pay attention to the study of students' mathematics knowledge but also pay attention to the development of students' mathematics culture and change the teaching objectives so that mathematics culture can be further infiltrated into middle school mathematics teaching. For example, when the teacher talks about the interior angle of the triangle which is equal to  $180^\circ$ , students can experience the charm of mathematical culture in the process of exploration. Throughout the process, we can recall Taylor's basic jigsaw method to understand the origin of the theorem. Students can explore together to understand the mystery of the interior angle of the triangle and the theorem. Through students' continuous understanding of the mathematics culture in middle school mathematics teaching, they can feel the charm of mathematics culture [6].

The reasonable infiltration of mathematics culture into middle school mathematics teaching must require mathematics education evaluation. A scientific and reasonable evaluation system can play a feedback and guiding role in the cultivation of students' mathematical culture and mathematical literacy. The improvement of students' confidence in mathematics learning needs effective evaluation to stimulate students' enthusiasm for learning mathematics. It is necessary to gradually change the view that all educators and parents have only achievement theory and return to the road of students' all-round development. Formative assessment and summative assessment can be used to evaluate students. The evaluation of mathematics teachers should also improve this view. The evaluation of teachers should be based on their comprehensive quality, for example, whether they have rich mathematical literacy and whether they can effectively transmit mathematical culture to students. This is the effectiveness of teacher evaluation in promoting the infiltration of mathematics culture into middle school mathematics teaching. The evaluators who evaluate teachers and students should be comprehensive, for example, increasing the evaluation of parents, leaders, and peers to achieve comprehensive evaluation. It can not only make students and teachers understand the effect of their mastery but also encourage teachers to improve teaching and learning methods in time. Reasonable teaching objectives and teaching evaluation are more conducive to the infiltration of mathematical culture.

## **2.4 The use of multimedia promotes the penetration of mathematical culture**

With the continuous progress of society and the continuous development of science and technology, the generation of multimedia has the advantages of large information capacity and fast speed. Therefore, the educational methods and means of middle school mathematics teaching have also changed greatly. Mathematics learning itself is boring, so mathematics teachers can use WeChat, QQ, and other social platforms to teach so that mathematics culture can further penetrate into middle school teaching. When teaching students mathematical culture, we can use video, PPT, pictures, and other means to transform abstract concepts and definitions into more vivid and three-dimensional expressions of mathematical

knowledge and understanding of mathematical culture. Students can use multimedia to understand mathematics culture, so as to reflect the timeliness and systematicness of students' learning mathematics culture. Mathematics teachers can also let students feel the extended mathematical culture of mathematics classrooms through multimedia, and then students can complete the extended homework assigned by teachers through the developed Internet, which can strengthen students' subjective initiative. Consolidate the mathematical knowledge learned and improve the perception of mathematical culture. As teachers, we should know that with the help of multimedia emerging technology, improve the penetration of mathematical culture [7].

### 2.5 Speed up the infiltration of mathematical culture in the examination questions

The infiltration of mathematical culture in teaching and the construction of a new high school mathematics classroom teaching model is integrated, and the mathematical culture is integrated with the actual teaching content, which is of great help for students to understand mathematical problems. Therefore, the infiltration of mathematics culture in middle school mathematics education and teaching plays an important role in excavating many functions of mathematics teaching and cultivating students' diversified abilities. Therefore, high school education has gradually infiltrated mathematical culture. In middle school mathematics teaching, students should be clear about the role of mathematical culture in human civilization. Mathematical culture positively affects the outlook on life and values of middle school students.

Therefore, it is necessary for mathematics culture to gradually penetrate into middle school mathematics teaching. In the college entrance examination papers in recent years, the mathematical cultural background questions show a certain proportion of the trend. For example, the third question of the multiple choice question in the college entrance examination volume I in 2019 and the fourth question of the multiple choice question in the college entrance examination volume I in 2020. This proves the importance of mathematical culture. Therefore, we should correct our attitude, enhance students' mathematics education literacy by infiltrating mathematics culture, and deepen the infiltration of mathematics culture.

### 3. Summary

In middle school mathematics teaching, the continuous infiltration of mathematics culture has also greatly helped mathematics teaching. From the beginning of mathematics and its continuous development, mathematical culture also has its position. We can also feel that mathematics has a temperature, and the temperature is reflected through mathematical culture. Through the understanding of mathematics culture at home and abroad and the understanding of many characteristics of mathematics culture, in understanding the current situation of mathematics culture in middle school teaching, we should increase the penetration of mathematics culture in mathematics teaching. We can accurately understand the essence and value of mathematics. Correct infiltration of mathematical culture, improve the quality of teaching and complete the task of mathematics teaching.

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