Research on Mathematics Culture and Mathematics Education

Meixia Liao

School of Mathematics and information Science, Jiangxi Normal University, Nanchang, Jiangxi, China

Abstract: Good mathematics education and mathematics culture complement each other, and excellent mathematics culture contains rich humanity content. In mathematics education, we should pay attention to give play to the effect of mathematics culture on students, so that students can understand the history of mathematics civilization and feel the humanitarianism of mathematics subject in the study of mathematics knowledge, so as to promote the development of thinking and enhance wisdom and cultivation.

1. Introduction

Mathematics is a rich humanities, mathematics education is extensive and profound. The standards of mathematics curriculum for ordinary high schools released in 2017 emphasize the infiltration of mathematics culture in mathematics. Mathematical culture infiltration of mathematics, therefore, the actual education teaching and help students to master the correct mathematical culture, let the students in the process of learning mathematics handling to mathematical culture and social cultural interaction, and thus the resonance of the cultural and with culture, for the development of mathematics education and the promotion of students' mathematics accomplishment is very important [1-2]. Deep penetration in mathematics education, development, and enrich mathematical culture, help students of mathematics culture in mathematics study evolution of the development of the correct understanding and attention to the inseparable relationship between mathematics and the overall cultural environment, not only conducive to changing mathematics education appear in the process of conclusion, the phenomenon of skills, thinking, also beneficial to cultivate the students to get good interest in math study and training of the students form a rigorous mathematical thinking, help students to understand mathematics appearance and set up the correct view of mathematics.

2. Experience the Wisdom of the Ancients in the Mathematics Culture

The emergence of the knot record accelerated the speed of human knowledge accumulation, is the starting point of human having long-term memory. In infants' preliminary understanding of mathematics, the use of "counting sticks", a tool of mathematical enlightenment, is the modern inheritance of knotting notes. Thales, a famous mathematician in ancient Greece, became the first person in history to measure the height of a pyramid through the application of the "triangle similarity" principle. Zu Chongzhi based on the existing empirical methods, through constant checking and studying, thus got the great achievement of calculating PI to seven figures after the decimal point and then influencing every aspect of the generations, and also laid a solid foundation for modern PI.

The world is endless, the mathematics is wonderful. In the process of exploring mathematics and groping to change the world, many ancient sages built bricks and tiles for the magic mansion of mathematics with their wisdom and diligence. Mathematics exists in every corner of the world and is closely related to our daily life and practical application. The infiltration of mathematics culture in mathematics education enhances students' understanding of the historical origin of the formation of mathematical knowledge and the corresponding historical background, and makes students realize the positive role of mathematics in promoting the development of human cognition and social production practice [3-4]. Among them, the mathematical culture reflects that the wisdom and diligence of the sages can not only stimulate students' interest in learning mathematics, but also

enhance students' pride in the nation and country, so as to achieve a certain value of mathematical education.

3. Appreciate the Beauty of Mathematics in the Mathematics Culture

The famous mathematician Proulx once said firmly that where there is mathematics, there is beauty. Mathematical beauty not only exists in natural beauty as objective basis, but also exists in scientific beauty as core strength. Mathematics contains beauty everywhere, and the culture of mathematics is a beautiful scroll. Yang hui triangle can let students experience the beauty of symmetry, China Unicom, Peking University founder these beautiful trademarks are symmetrical beauty of modern textbooks; Pythagorean theorem, sines and cosines theorem these beautiful formulas can let students experience the beauty of simplicity; The establishment of cartesian coordinate geometry can make students feel the unity beauty between algebra and geometry. Four color theorem, mutation theory and other surprising mathematical research let students enjoy the strange beauty of mathematics; The extraordinary wisdom and ability of mathematicians in various periods, and the ideological quality advocated by them, are all excellent materials of moral character in mathematics education. The study of these mathematical cultures helps students master the rules and logic of different development directions of mathematics, extract the internal connections between different mathematical knowledge, grasp the essence of mathematics and experience the colorful and rich beauty of mathematics [5]. Students appreciate the beauty of mathematics at the same time, also inspired their own in-depth pursuit of mathematical knowledge and sincere exploration, cultivate their continuous pursuit, strive for the lofty aspirations. In the process of promoting mathematical culture, students are guided to feel the beauty contained in mathematics, to appreciate the infinite charm of mathematics, and to discover the aesthetic education value and creation value of mathematics.

4. Stimulate Thinking and Creation in Mathematical Culture

Mathematics is a humanities science that stresses practical and rigorous, extremely close logic. Every step of reasoning, calculus, hypothesis and proof must have rigorous and practical logical inference. Skepticism is advocated by mathematical culture, learning mathematics culture, students can be formed with suspicion as clues, the habit of thinking as the core, to let the students respecting the rule of the nature of mathematics, and the rigorous doing scholarly research, careful insight into the mathematical learning habit, also can stimulate mathematics question consciousness, strengthen their own learning subject position, this is good for students' mathematics learning. Mathematicians at the same time to explore the spirit of innovation and a treasure of mathematical culture, can stimulate the student for unknown knowledge exploring interest in learning life, learn to identify, create migration, get the mathematics view of the world, using mathematical thinking habit, discover the world and gradually lead the student to obtain the practice innovation ability. In addition, the correct and make full use of mathematics culture in mathematics education has positive guiding role, the introduction of case of nutrient rich dialectical thinking in mathematical culture and to facilitate students to set up the ideas of materialism, and form the dialectical analysis ability, in order to help students to avoid in the abstract principle of learning into the rigid mode of thinking [6]. Moreover, the unique visualization of mathematical culture and the status quo of the development process of mathematical culture itself show the rigorous mathematical research attitude and the unremitting mathematical spirit, which can make students acquire more flexible thinking ability and add vitality to the development of mathematical discipline.

5. Improve Math Teaching with Math Culture

As a rigorous and standardized discipline representative, mathematics teaching work should not only focus on teaching mathematical formulas and theorems to students, but should integrate mathematics culture into mathematics teaching effectively and organically, so as to guide the reform

of mathematics education positively and enrich the level of mathematics teaching so as to cultivate students' humanistic spirit and mathematical thinking. In the actual process of mathematics teaching should pay attention to change the traditional concept of heavy light practice teaching mode, pay attention to the development of math concepts and principles of development and application value, can be related to the mathematics knowledge background or a process of discovery, put forward and solving mathematics problems and the methods to solve the same problem in different periods is introduced into the mathematics teaching, in order to develop the students' field of vision and let the students more profound understanding of the mathematical knowledge.

Teaching students, for example, the typical sampling method in mathematical statistics discipline, can introduce the United States often used random sampling method to predict four years a presidential election candidate, the extract of thousands people from before to tens of thousands of people, and now thousands of people, can forecast results within one percent, the accuracy of the control to cause the student to the knowledge about "sampling" attention, in turn, stimulates the student to subsequent learning desire. Then introduced in 1936, the United States has many years of experience in predict presidential campaign winner of the journal literature abstract according to the address on the phone and the address of the club members list sent ten million inquiry letter, and should be returned to the results of the 2 million letters of predicting Langdon would become President election winner, but the reality is that Roosevelt the events in a landslide election, guides the student to guess in with such large sample size of conditions, only to predict the failure reason, cause students to think and lead students to explore this issue. The result is that literary digest's sample of wealthy households with private telephones and clubbed members fails to take into account the general population, making the sample so skewed that it is not representative. In the process of exploration, problems are solved to deepen students' grasp of the knowledge that "sampling method should be representative".

Through the unique charm contained in mathematics to arouse students' interest in exploring the development of mathematics culture independently, at the same time, through the influence of mathematics culture accepted by students to promote students to learn mathematics, learn to understand mathematics, so as to cultivate students' ability to think independently of problems and view the value of mathematics correctly.

6. Develop the Culture of Mathematics in Mathematics Education

Students can make use of mathematical thinking to solve problems is a key part of mathematical education, in a lifelong learning may be forgetting what they have learned before mathematics theorem, etc., but in the past produced in the process of learning view of the problems of mathematical thinking and problem solving mathematical rational thinking can let a person benefit life, the story of "three wire", for example, the mathematical thought and mathematical way of thinking is a kind of mathematical culture. Therefore consciously permeability related elements of mathematics culture in mathematics education, at the same time in everyday mathematics education, pay attention to the implementation of the teaching of mathematical thinking and form the guidance of mathematical thinking and penetration of mathematical culture important measures, infiltration of mathematical culture for students intellectual enlightenment and spiritual mold is also potentially lasting help.

In mathematics education, not only should pay attention to mathematical knowledge, a professor of notice, a professor at the process of mathematics knowledge, because in the process of education learning contains the spirit is more important than math results of mathematical thought, so in mathematics education is not only to let students focus on mathematics result to let students pay attention to the result of exploration process so as to make students more intuitively recognize the mathematics knowledge to generate dynamic, this is also a kind of mathematical culture in the process of mathematical research. For example in the exploration of "Goldbach conjecture" prove since 1920 brown Norway mathematicians prove to Chinese mathematician trained Chen Jingrun proved to now for this conjecture, it never stop exploring let us deepen understanding of mathematics the subject also incisively and vividly reflected the explore the essence of mathematics

culture.

Teachers play a crucial role in mathematics education, so teachers should have a strong sense of the need to integrate mathematics culture into mathematics education, and teachers themselves must maintain a strong sense of identity with mathematics culture. In the development of teaching work, teachers should not just talk about culture, but should combine mathematics culture with mathematics curriculum content and implement it into concrete teaching behavior design. For example, when solving a quadratic equation problem about the design of human body statue in the middle school mathematics textbook of the people's education edition, students can be appropriately introduced to some knowledge about the "golden section" according to the fact that the solution of the problem is 0.618, so as to expand their knowledge and enrich their grasp of the level of mathematics culture.

Mathematics is not an independent discipline, mathematics culture and other disciplines are more or less a certain degree of communication. For example, many famous philosophers in history also have great achievements in the field of mathematics, such as Russell, Bacon, etc. There is a college course called equations of mathematical physics; Many ancient poems also contain mathematical knowledge and mathematical problems, such as the inscriptions in Su Shi's painting "the picture of birds returning to their nests" and the "calculating the laws of the emperor". In sports training, some mathematical calculations are often used to regulate some training movements or seek the optimal athletic scheme. For example, American computer experts once put forward discus throwing theory with the help of mathematical knowledge, which made a discus thrower greatly improve his performance in a short period of time and broke three world records in a row. Therefore, as an excellent mathematics educator, one should not only have knowledge and skills limited to mathematics, but also be able to relate to related fields of various disciplines and constantly enrich his knowledge reserve, so as to permeate the culture of mathematics and reflect the cultural value of mathematics in daily mathematics teaching.

7. Conclusion

"A true understanding of mathematics is an organic whole, the basis of scientific thought and action," Cochran wrote in the preface to the first edition of what mathematics is. Mathematical knowledge is not isolated, static but often closely related with the development of the society, human activities, the mathematics culture and the mathematics education has always been to keep the sometimes-complex mix-and-match, I have you is inseparable from the state, reflect the mathematics culture in mathematics education at the same time, using mathematical culture to promote the development of mathematics education in order to show multiple dynamic mathematical knowledge. Increase in mathematics education of mathematics culture identity and culture lead the students to learn mathematics, lead students to pursue math history origin, helping students to grope for mathematical disciplines found between human and social development and the correct association, helps the student to the mathematics knowledge learning have a more comprehensive understanding, which is beneficial to the student to obtain excellent mathematics literacy and improve the corresponding mathematical culture self-restraint.

References

[1] Ministry of education. Mathematics curriculum standard of general high school (2017 Edition) [M]. Beijing: People's education press, 2018.

[2] Feng Li. The infiltration of mathematical culture in high school mathematics teaching [J]. Journal of learning, 2020, (01), 75 dol: 10.16657/j.cnki.issn1673-9132.2020.01.070.

[3] Li Xiao Hua. Analysis of the educational value of mathematics culture [J]. Mathematics teaching communication, 2019, (18), 34-35.

[4] Wang Tao. Understanding and thinking of mathematical culture [J]. Teaching and learning of higher mathematics.2019.

[5] Chen Yu Hua. Exploration of integrating mathematical culture into high school mathematics teaching [D]. Central China normal university, 2017.

[6] Ling Yan. A preliminary study on the integration of mathematics culture into mathematics classroom in secondary vocational schools [J]. Modern vocational education, 2018(18):101.