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The Methods to Guide Students to Experience the Process of Knowledge Generation

Aijuan Zhang

Caofeidian College Of Technology, Tangshan, Hebei, China

Abstract: ***In teaching, students should be guided to constantly "clean the sand", constantly analyze knowledge layer by layer from the outside to the inside, expose the process of thinking development, experience the process of knowledge generation, and finally "harvest gold" - to construct their own mathematical knowledge. Pay attention to experience and expose the formation process of concept; Camera induction, the exploration process of exposure rules; Encourage debate and expose the improvement process of conclusions; Try to make mistakes and expose the correction process of mistakes. Only by allowing students to experience mathematics and expose the process of thinking development can they really "Touch Math".***

Keywords: Expose the thinking process; Experience mathematics; Building knowledge.

1. INTRODUCTION

The traditional mathematics teaching has always remained in the teaching mode of imparting knowledge. In the teaching, the students overemphasize the inculcation and memory of mathematical concepts, rules, properties and formulas, neglect the disclosure and exploration of the generation, development, formation and application of these knowledge, and are not good at exposing the rich thinking methods contained in the knowledge. The students learn the knowledge of rootless trees and water without roots. The famous child development psychologist Polya pointed out: "Let students see the "Scaffold", not the ready-made product of mathematics ". The Mathematics Curriculum Standard also clearly points out that "mathematics teaching should not only teach mathematical knowledge, but also reveal the thinking process of acquiring knowledge, which is more important for the development of mathematical ability." In teaching, students should be guided to constantly "clean the sand", constantly analyze the knowledge layer by layer from the outside to the inside, and expose the development process of thinking, so as to finally "harvest gold" - build their own mathematical knowledge.

2. FOCUS ON EXPERIENCE AND EXPOSE THE FORMATION PROCESS OF CONCEPT

The learning content comes from the actual life of students. Learning on the basis of students' existing experience can make learning more effective. In mathematics teaching, teachers should pay attention to the students' existing experience, seize the opportunity to create situations closely related to the students' living environment and knowledge background, so that students can gradually improve their original superficial understanding in mathematics activities, and experience the process of concept formation and development. For example, when teaching "Understanding of Circle", students have accumulated quite rich experience about circle in their daily life and activities: they have seen various circles in life, and can also learn about circle from extracurricular books and television media. All the activities have made them acquire the most basic concepts about circles. Although these concepts are informal, unsystematic, even vague and wrong, they have laid the necessary foundation for them to learn circles. So let students try to draw a circle with a compass before exploring the relevant knowledge of circle. After drawing, ask the students to guess "some students are not ideal enough. Where might he go wrong?" Some students said, "He may take the compasses irregularly and didn't hold the handle of the compasses"; Some students said that "the end with the needle tip may have moved" and so on. After summarizing the problems in drawing a circle, let students find ways to make the circle drawn by the whole class the same size, and let students feel that the size of the circle is related to the radius; Then let the students say in their own words how big a circle it is. In this process, students continue to use the original experience background to explain and process new mathematical phenomena. What students construct is not static knowledge in books, but spiritual mathematics, which is students' own mathematics.

3. EXPLORATION PROCESS OF CAMERA INDUCTION AND EXPOSURE LAW

Suhomlinski said: "If the process of mastering knowledge is compared to building a building, then what teachers should provide to students is only building materials, and the real architect is students themselves." Classroom teaching is a bilateral activity between teachers and students, and teachers' "Teaching" is to induce students to "learn". In the teaching process, teachers provide "building materials" suitable for students to explore, guide students to actively participate in the exploration of new knowledge, constantly generate the question of "how?" "why is this?", and then discover new laws through the exploration of tracing roots and sources.

For example, When teaching "the characteristics of fractions that can be converted into finite decimals", at the beginning of the class, the teacher mysteriously asked the students to test the teacher and let the students say some fractions at will. The teacher quickly judged whether they can be converted into finite decimals, and asked two students to use a calculator to verify the results

on the spot. When the students were surprised, they asked: "Do you want to know the teacher's secret?" The students said in unison: "Want to know the teacher's secret?" ", thus creating the best situation for teaching. Then show some scores 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/10, 1/25 let students turn into decimals, and guess: "Is this secret in the numerator of fractions? Or in the denominator of fractions? Why?" When students observe that the law exists in the denominator. Ask: "What are the characteristics of the denominator of fractions that can be converted into finite decimals? "The students talked with interest: some students said that the denominator was a composite fraction, but 1/6 could not be converted into finite decimals, while 1/2 could be converted into finite decimals; some students said that the denominator should be an even fraction, but 1/6 could not be converted into finite decimals, but 1/25 could be converted into finite decimals... When the students were confused, the students were inspired to try to decompose the denominator of fractions into prime factors, thus discovering the characteristics of fractions that can be converted into finite decimals 。 While the students were quite successful, the teacher took the opportunity to point out that 8/24 and 6/24. Why are the denominators the same as 24, but there are two different results when they are converted into decimals? The students' understanding has aroused new conflicts, thus leading them to discover the important prerequisite of "a minimum score" through practice and thinking again. Inspired by the inherent charm of knowledge, students have overcome one cognitive conflict after another, actively participate in the process of the occurrence, development and formation of knowledge, and taste the joy of exploring mathematical laws.

4. ENCOURAGE DEBATE AND EXPOSE THE IMPROVEMENT PROCESS OF CONCLUSIONS

Marx said, "The truth is determined by debate." Without debate, we cannot "Distinguish between similarities and differences" and "debate between right and wrong". The classroom is the post station for life communication and the stage for thinking collision. Facing each student with flesh and blood and full of personality, teachers should fully trust students, respect their personality, believe in their potential, and be full of enthusiasm.

Create opportunities for students to communicate and discuss, encourage debate, let them open their hearts, improve their conclusions in heart-to-heart communication, in emotional interaction, in the collision of thinking, and enjoy the fun of learning. When learning "the understanding of fractions", a teacher provided the students with the following controversial topic: divide a circle into two parts, each of which must be half of the circle. A heated debate began. The representative of Party A divided the circle in his hand equally into two parts and asked: "Do I divide this circle into two parts?" Party B: "Yes." Party A raised half of the circle and asked: "Is this half of the circle?" Party B: "Yes. Party A was aggressive:" Since it is half of the circle, why don't you agree with this statement? "Party B turned to the siege. The representative of Party B tore a piece of paper from the round piece of paper and raised the two parts of the paper and asked: "Is this divided into two parts?" Party A: "Yes." Party B raised a small piece of paper and said, "Is this half of the round?" Party A's confidence was insufficient: "No." Party B held on: "Since it is not half, why should we agree with this statement?" Party A was convinced. At this time, the teacher came to the stage from behind the scenes and said, "Congratulations to the students of Party B, but also thank the students of Party A. Because of your speech, it brought us a meaningful discussion and made us understand the problem more deeply. Your quick thinking and eloquent eloquence left a deep impression on everyone. Whether you are winners or temporary losers, you should be proud." Applause was heard in the class. During the debate, students not only deepen their understanding of mathematical knowledge, but also learn the attitude and skills of being brave to challenge and good at learning from their peers, and learn to listen, accept and appreciate. A few simple words of encouragement from the teacher let the winners face the joy of experiencing success; Let the temporary loser regain face. In exchange, experience is shared; In questioning, knowledge is confirmed; In addition, Italy.

In classroom teaching, teachers often insist on reminding students not to make mistakes, for fear of students making mistakes. Reminders and defenses against students' mistakes are repeated to nip students' mistakes in the bud together with the possibility of creation. Social psychologists have pointed out: "We even 'expect' students to make mistakes, because learning from mistakes can win success tomorrow." The process of students' exploration of new knowledge is often not straight, which will lead to one kind of mistakes or another. From the perspective of "student development oriented" personalized education, the seemingly smooth course in the past may not be a good course, because it "hides" students' mistakes. "To deprive students of the right to make mistakes is to limit their free will." Therefore, instead of covering up students' misconceptions, students should be exposed to misconceptions, and sometimes even teachers should deliberately make mistakes. By letting students analyze the causes of mistakes, students can learn from the negative side and quickly come out of mistakes, thus correcting mistakes, enhancing the ability to identify errors, and improving the ability to analyze and solve problems.

5. CONCLUSION

Mathematics class is a big stage for students to show their passion, wisdom and personality. Exposing the development process of students' thinking can make students' thinking active. Every small discovery of students expresses their understanding and creation of mathematics learning individuality; Each small supplement witnessed the cultivation of their mathematical experience and the improvement of their understanding ability. Only by allowing students to experience mathematics and expose the process of thinking development can they really "touch mathematics" and build their own mathematical knowledge.

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