Reflections on Implementing Geometric IntuitionLiteracy in Junior High School Mathematics Classroom Teaching

ABSTRACT: As one of the core literacy emphasized in *the Mathematics Curriculum Standards for Compulsory Education (2022 Edition)*, geometric intuition has been widely valued in the current junior high school mathematics teaching. Based on the method of theoretical analysis, this paper analyzes the connotation of geometric intuition literacy and combines it with the practice of current mathematics classroom teaching, and proposes four implementation strategies for geometric intuition literacy in junior high school mathematics classroom, which are as follows: 1.Add operational practice to classroom teaching; 2. Provide thematic courses related to ruler drawing; 3. Reasonable use of modern educational technology to assist classroom teaching; 4. Organize special questions about charts to practice with students. These strategies can be used for reference by junior high school mathematics teachers in practical teaching.

Keywords: Junior High School Mathematics; Core Literacy, Geometric Intuition; Teaching Strategies

1. INTRODUCTION

TheMathematics Curriculum Standards for Compulsory Education (2022 Edition) (hereinafter referred to as the *Standards*) emphasizes that mathematical literacy is the basic literacy that every citizen in modern society should have [1]. As one of the core mathematics literacy in junior high school, geometric intuition refers to the awareness and habit of being able to describe and analyze problems with charts. The implementation of geometric intuition can help students transform abstraction into intuition and quickly find ideas for solving problems, thus effectively improving problem-solving efficiency and laying a foundation for subsequent learning. Therefore, the cultivation of geometric intuition literacy is always an important issue that teachers need to pay attention to [2]. So what are the training requirements for geometric intuition? What is the current situation of mathematics classroom teaching? What measures should teachers take in teaching to effectively implement geometric intuition? This paper will analyze and discuss the above problems.

2. ANALYSIS OF GEOMETRIC INTUITION LITERACY

The *Standards* proposes that geometric intuition literacy refers to students' awareness

and habit of using charts to describe and analyze problems [1]. Among them, the requirements for students have the following four aspects:

First, students can perceive geometric figures and their constituent elements and classify them according to the characteristics of the figures. The perceive refers to the process of a person processing the sensory information they get through feeling things, to obtain the knowledge and understanding of things. This is to require students to observe the graphics abstracted from the physical objects and be able to form a certain understanding of them and their constituent elements, and finally be able to distinguish the various elements that constitute the graphics. At the same time, students should be able to feel the unique external performance of different graphics through direct observation, to distinguish between different graphics.

Second, students can draw the corresponding figure according to the language description and analyze the nature of the figure.This requires students to accurately grasp the relevant concepts of points, lines, surfaces, angles, circles and other geometric elements, understand the true meaning of drawing language and learn the method of drawing with the ruler, draw corresponding graphs according to descriptions, and start from the basic facts to carry out in-depth learning of the nature of graphs.

Third, students can establish the connection between shapes and numbers, to construct intuitive models of mathematical problems. The shapes refer to the intuitive geometric figures and graphic language in mathematics, and the numbers refer to the abstract mathematical language, symbols and quantitative relationships in mathematics. To establish the connection between numbers and shapes is to combine the abstract mathematical language with the intuitive graphic language so that they can represent and transform each other. Mathematical problems are the results of abstraction, and the intuitive models of mathematical problems are to visualize abstract knowledge and simplify logical processes [3]. This requires students to learn to combine ideas of number and shape understand the mutual relationship between shape and number, and be able to use intuitive graphics to express abstract numbers so that they can ultimately transform the abstract mathematical language in the problem into intuitive graphic language according to the conditions.

Fourth, students can use charts to analyze real situations and mathematical problemsand explore ways to solve problems. The chart is a way to visualize data

information, that is, to present the quantity and relationship of reality in the form of images and tables [4].This requires students to learn to observe and analyze charts on the premise of understanding the role and value of charts, understanding the meaning of the information presented in charts, and then using charts to understand and explain mathematical problems and realistic situations, to explore the thinking path of problem-solving.

3. CURRENT STATUS OF TEACHING AND LEARNING

3.1 Teachers focus on the explanation of knowledge and ignore the students' practical operation

In the current mathematics classroom teaching, due to the limited class time, most teachers only pay attention to the explanation of knowledge points in this class, attach importance to students' memory of knowledge points, and ignore students' experience and perception of knowledge [5]. This phenomenon is especially reflected in geometry teaching. Due to the weak abstract ability of students in junior high school, students are more likely to accept things they can touch and prefer to operate activities. For the explanation of geometric figures, teachers mostly provide students with auditory or visual experience through language teaching or whiteboard demonstration, but neglect students' tactile experience. This does not allow students to truly experience knowledge, nor is it conducive to students' in-depth understanding and long-term retention of such knowledge.

3.2 Students have weak hands-on analysis and problem-solving skills

Most students generally believe that mathematics learning only needs to learn calculation, so students only have paper and pen to learn mathematics. They do not have a comprehensive understanding of the use of mathematical mapping tools such as compass, ruler and triangle ruler, and do not pay attention to some problems that need to be solved by hands, so they often choose to avoid these problems. Some teachers do not pay attention to some hands-on teaching, such as ruler drawing, and only teach students roughly when they need to use them. As a result, the content of this part becomes scattered and complicated, which fails to effectively cultivate students' hands-on ability and hinders the development of students' mathematical literacy.

3.3 Teachers' use of information technology tends to be formalized

Most teachers already have the consciousness of information technology-assisted teaching, but they do not understand the use of information technology, which leads to their inability to use information technology reasonably. In actual teaching, these teachers only frequently use the display function of information technology, without really exerting the auxiliary value of information technology, which completely loses the original meaning of information technology-assisted teaching, making the use of information technology gradually tend to be formalized [6]. This is not conducive to the interaction between teachers and students, nor is it conducive to the real value of information technology in classroom teaching.

3.4 Some teachers give priority to teaching and neglect students' practice in classroom teaching

Influenced by traditional teaching, some teachers still focus on their own teaching [7]. For some math problems, teachers often focus on how to explain the method of solving the problem and rarely leave time for students to solve the problem themselves in class. Only by listening to the teacher's explanation in class without practicing, students can't learn the ideas and methods of solving problems, and it is difficult to form the corresponding knowledge system, which will discourage students' enthusiasm for learning mathematics over time. Many students do not have the opportunity to try new methods and still stick to their original solutions, which may also lead to the narrowing of students' thinking perspectives.

4. TEACHING STRATEGIESFOR IMPLEMENTING GEOMETRIC INTUITION

4.1 Add operational practice to classroom teaching

This requires teachers to prepare geometric models for students in the teaching of graphics and geometry and lead students to directly feel the features and components of geometric figures through the operation and contact of geometric figures, to understand the relevant conclusions of figures and to form a perceptual understanding of geometric figures.

One of the requirements of the training in geometric intuition is to enable students to perceive geometric shapes and their component elements and classify them according

to their characteristics. This is to allow students to process the sensory information obtained in their minds through the perception of geometric figures, and finally form certain knowledge and understanding. By providing practical operation activities for students, we can help students build a perceptual bridge between them and geometric figures so that they can perceive geometric figures, which is an important way to perceive geometric figures. One of the current teaching situations is that teachers pay attention to the explanation of knowledge points but lack practical activities, which makes students lack perceptual understanding of knowledge and difficult to deeply understand knowledge. Therefore, teachers need to add operational practice in geometry teaching so that students can directly feel the features of shapes and understand the nature of shapes and finally enable students to perceive geometric shapes and their component elements and classify shapes based on observation.

4.2 Provide thematic courses related to ruler drawing

This requires teachers to organize the teaching content of ruler drawing to set up thematic teaching, lead students to learn the method of ruler drawing, pay attention to the norms of ruler drawing, and personally experience the process of drawingso that students can understand the basic principles of drawing and learn the standardized methods of ruler drawing, to improve students' ability of ruler drawing.

One of the training requirements of geometric intuition is to enable students to draw corresponding figures according to language descriptions and analyze the nature of figures. The training requirement is to enable students to understand and learn the correct method of ruler drawing. One of the current teaching situations is that some teachers do not pay attention to the teaching of ruler drawing, and the pertinence of students' ruler drawing training is poor, resulting in students' weak hands-on ability and unfamiliarity with the use of drawing tools and the process of drawing. Therefore, the current mathematics teaching should set up thematic courses related to ruler drawing to strengthen the training of students' ruler drawing, lead students to learn the method of drawing and understand the principle of drawing through the process of drawing, and finally draw corresponding figures according to the requirements and analyze the nature of the figures, to improve the development of geometric intuition literacy.

4.3 Reasonable use of modern educational technology to assist classroom teaching

This requires teachers to identify the advantages and characteristics of different educational technologies and use the most effective technological tools to assist teaching in different teaching places. Teachers can use computer graphics software to show the teaching of graphic changes for students and use multimedia technology to teach the combination of algebra and graphics, to give play to the real value of different educational technologies.

One of the requirements of the training in geometric intuition is to enable students to establish the relationship between numbers and shapes, and to construct intuitive models of mathematical problems. The training requirement is to let students learn the idea of combining numbers and shapes to understand the relationship between numbers and shapes, and teachers can intuitively show the relationship between numbers and shapes for students through information technology, which can effectively help students establish the connection between numbers and shapes. One of the current teaching situations is that teachers generally have the awareness of information technology to assist teaching, but they can not reasonably use information technology to assist teaching so they do not effectively play the true value of information technology in classroom teaching. Therefore, the current practical teaching needs to pay attention to the rational use of modern educational technology, make use of the intuitive function of information technology to help students establish the relationship between numbers and shapes, and give full play to the maximum value of information technology so that students can learn to build intuitive models of mathematical problems and promote students' geometric intuition.

4.4 Organize special questions about charts to practice with students

This requires teachers to pay attention to students' practice of graph-type problems and sort out math problems that need to be solved by graphs for students to practice. In this process, teachers should lead students to analyze and understand different types of charts, so that students can understand the meaning of charts in the process of solving problems.

One of the training requirements of geometric intuition is that students can use charts to analyze real situations and mathematical problemsand explore ways to solve problems. This requires students to appreciate the value of charts and use the information in them to understand and analyze mathematical problems. One of the current teaching situations is that teachers mainly teach in the classroom, students have less time to practice, which makes students 'thinking methods single and their sensitivity to the charts is not strong, it is difficult for students to deeply feel the

significance of the charts. Therefore, current teaching should sort out chart problems, connect different types of charts and lead students to practice, develop students 'ability to analyze charts and let students understand the value of charts in the process of mining chart information and finding the connection between charts and mathematical problems. Finally, students can analyze mathematical problems with the help of charts and find ideas for solving problems.

5. CONCLUDING REMARKS

Geometric intuition literacy is one of the core literacy of junior high school mathematics. Teachers should clarify the training requirements of geometric intuition literacy in classroom teaching and adopt appropriate ways to ensure the effective implementation of geometric intuition literacy. To effectively implement geometric intuition literacy in classroom teaching, we believe that teachers should add operational practice to classroom teaching, provide thematic courses related to ruler drawing, reasonable use of modern educational technology to assist classroom teaching, organize special questions about charts to practice with students and so on. However, whether the above strategies are truly effective in teaching still needs to be verified extensively and over a long period of time.

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