IOSR Journal of Research & Method in Education (IOSR-JRME)
e- ISSN: 2320–7388,p-ISSN: 2320–737X Volume 8, Issue 5 Ver. IV. (Sep. – Oct. 2018), PP 47-50
www.iosrjournals.org

Research on Problem Scenarios and Creation in the Mathematics Classroom of Primary Schools

Ling Ling Lu
Faculty of History and Archaeology, Anyang Normal University, China
Corresponding Author: Ling Ling Lu

Abstract: *"Scenario creation" is a commonly used strategy in the mathematics classroom teaching of primary schools. It is conducive to solving the contradiction between the high abstraction of mathematics and the concrete image of primary school students' thinking. "Mathematics Curriculum Standards" regards the creation of "problem situations" as an important part of teaching. However, there are different drawbacks in the creation of scenarios in our actual teaching process. Therefore, based on the concept of "problem scenario" in mathematics teaching, the significance of teaching, and the principle of creating problem scenarios, this paper proposes five methods for creating problem scenarios that can be effectively applied in practical mathematics teaching.*

Keywords: *mathematics classroom in primary schools, problem scenarios, creation*

Date of Submission: 01-10-2018 Date of acceptance: 16-10-2018

I. Introduction

The "Mathematics Curriculum Standards" states that mathematics teaching should be closely related to the reality of students' life, starting from students' experience and existing knowledge, creating a learning situation closely related to the students' living environment and knowledge background, and which is also of interest to the students. Let students in observation, operation, speculation, communication, reflection and other activities to gradually understand the generation, formation and development of mathematical knowledge process [1]. Learning mathematics in the context is the most interesting for students; close to life to learn mathematics is the most motivating to motivate students to learn. Because the setting of effective teaching situation is helpful to solve the contradiction between the high abstractness of mathematics and the concrete image of the thinking of primary school students, to restore the vivid scene of formation and application of knowledge, so that the qualitative knowledge presents a state of intelligence. It provides students with the opportunity to engage in mathematics activities, stimulate interest in mathematics, and encourage students to learn mathematics.

In the current mathematics teaching of primary schools, scenario teaching has attracted widespread attention, and the original classroom teaching structure has gradually changed into: creating a situation - exploring new knowledge - consolidating applications. Creating a good situation, making mathematics knowledge closer to social life and children's reality, can change the original boring and abstract mathematics teaching situation. But unfortunately, there are still many problems in the creation of the situation. Some of the situations presented to students by teachers are not familiar to students, are not in line with the reason of life or are completely artificially fabricated. Students can not feel the existence of mathematical problems or can not excavate mathematical problems related to what they have learned. This mathematical situation is at least of little value or even meaningless in the teaching of relevant mathematics. How to create an effective situation and make students really benefit is a problem we should study. The new curriculum emphasizes "everyone learns valuable mathematics". Students' mathematics learning content should be realistic, meaningful, and challenging.

II. The Concept of "Problem Scenarios"

A problem scenario is a psychological dilemma formed when an individual makes an active response to an objective problem, perceives a certain purpose and does not know how to achieve it. It is a state of mind in which the existing knowledge cannot solve the new problems. It should be said that not all the problems must form problem scenarios, the key to form problem scenarios is to see whether the problem can stimulate and cause the subject to actively respond, and enter into such a psychological state. Problems that can be solved without thinking and by memory alone clearly do not create a real problem situation [2].

The problem scenario in mathematics teaching is a kind of stimulating data material and background information set for mathematics learning to stimulate students' problem consciousness as value orientation. It is

the environment for engaging in mathematical activities and the conditions for generating mathematical behavior.

(1) Mathematical problem scenario is a kind of data material and background information. These data materials and background information become the real problem carrier for students to carry out mathematical inquiry activities. For example, in the teaching of statistical knowledge, the mathematics test transcripts of a class of students are provided to students. This is a data material type problem situation. Students use these data as a basis to analyze and organize them. For another example, when teaching the meaning of division, a teacher designed a situation of "Little Monkeys and Peaches": assigning 8 peaches to 2 monkeys. This is a background information type problem situation. In this situation, students use this practical task as the target of inquiry and explore the activities of mathematics. Therefore, the problem situation is an indispensable support material for mathematics learning activities.

(2) The value orientation of mathematical problem scenarios is to arouse students' problem consciousness. Not all the data materials and background information are suitable for the problem scenario in mathematics teaching, and the selected background material can not be displayed in any form to become a successful mathematical problem situation. The content and form of mathematical problem situation should be based on stimulating students' problem consciousness, and it has a strong purpose. Therefore, both the content selection and formal design of data materials and background information have a clear orientation.

(3) Mathematical problem scenarios have certain irritability. A successful mathematical problem scenario should be based on the students' actual life and learning experience, and should be displayed in a form that is consistent with children's psychological characteristics and enjoyed by children. It is of great help to stimulate students' interest in exploring and guiding learning methods. Therefore, it is a kind of background material with positive stimulus. It is a prelude and effective preparation for students' mathematics learning activities. It is conducive to solving the contradiction between the abstraction of mathematics knowledge and the concreteness of students' thinking. Students develop open thinking, learn to use, understand the meaning of learning mathematics from life, convert boring numbers into sensible knowledge that students can see and feel, and improve students' interest in learning mathematics.

III. The Significance of Problem Scenario Teaching in Mathematics Conceptual Teaching

The purpose of creating a problem scenario situation is to help students learn mathematics more effectively. The essence of the problem situation is a vivid life event. In the teaching of mathematics, the students' life experience is connected, and the mathematical problem situation in life is created. When creating problem situations, teachers can choose materials close to the reality of students' life through creative activities, simulate the problem situations, let the students experience it personally, and let the students learn mathematics in the dynamic process of asking questions, thinking about problems and solving problems. Learn mathematics in the dynamic process of problem solving. This kind of learning activity is not only that students can apply the knowledge they have learned flexibly to practice, but also that they should develop from this learning process and acquire new methods of mathematics knowledge. The problem scenario teaching has the following main meanings in the mathematics classroom teaching of primary schools:

(1) Creating problem scenarios helps to enhance the intimacy between students and knowledge. Interest is the best teacher, the simple truth of "knowing the teacher is the way to believe in it" can be said to be well known. In the true sense, “affinity” refers to whether students have a strong sense of identity to knowledge, in other words, whether students are willing to understand the occurrence of knowledge. The core of the problem situation is to correspond with knowledge. Therefore, creating a problem situation can close the distance between students and knowledge, thus helping students to deeply understand the teaching content and stimulate students' desire for exploration [3].

(2) Creating problem situation is helpful to stimulate learning interest. The desire of students to learn is directly related to the learning effect of students. An extremely interesting example or story will give students endless breadth and depth of thinking. Once the door of thinking is opened, we will not be able to imagine the depth of thinking of students. It promotes the pace of students entering this section of knowledge.

Usually we will start from the reality, make the knowledge that the student wants to learn from their actual life as much as possible, and create a problematic situation of life, so that students are willing to invest and think positively, thus they form a good habit of mathematical thinking.

(3) Creating problem scenarios is helpful to help students build up confidence in problem raising and problem solving. Through learning in specific situations, students can clearly perceive what types of problems can be solved by what knowledge they have learned, thereby stimulating the extension of students' thinking. A senior education expert once said: "No problem is more terrible than not solving it". Therefore, teachers should cultivate students' ability to ask questions. With their own problems, students will have a strong desire to explore and solve problems, thus flexibly transfer and apply the knowledge they have learned.

IV. Principles for Creating Problem Scenarios

(1) Effectiveness principle. The setting of the problem scenarios must pay attention to the actual effect, that is, the setting of the problem situation must have certain practical efficiency, and the invalid or inefficient situation can not be set for the form of the problem situation [4]. Professor Zengru Luo proposed "zero situation" and "negative situation" in mathematics problem scenarios in the corse of advanced class of teaching expert in Shaanxi province in 2012. "Zero situation" means that there is no positive meaning to mathematics learning and does not play its due role in teaching situation. "negative situation", as the name implies, not only does not have any positive effect, but also affects the development and implementation of classroom teaching. It reduces the effect of classroom teaching and becomes the failure of classroom teaching. For example, in the teaching of axisymmetric graphics, a teacher produced a large number of axisymmetric figures, which did not lead students to abstract general features from intuitive graphics, nor did they make rational analysis of axisymmetric phenomena. The student just looked at a lot of pictures. At the end of a class, the students learned nothing about the concept, nature, and drawing methods of axisymmetry. This kind of problem scenario has little effect, but delays precious teaching time, is typical "negative scenario".

(2) Principle of authenticity.When setting problem situations, try to make sure that the data and background materials involved are true, rigorous, scientific and not misleading students. For example, in the open teaching of mathematics in Lantian in 2010, a teacher designed an "absolute value" lesson. There was a problem scenario in which the green light cross of Lantian County was taken as the origin and a unit of length represents a kilometre, a point corresponding to Lantian Food City in -3.5, and Meiyu Street to a point corresponding to 4.8. This problem situation is intended to lead to the concept of absolute value: the distance from the point corresponding to a number on the number axis to the origin is called the absolute value of this number. The design teacher did not actually consider the location and direction of the two locations, but chose two representative location nouns at random. The actual situation is that the street between Meiji City and Meiyu is not in a straight line, and the direction is also wrong. In this way, the background material can not be directly related to the mathematical knowledge involved, which will affect the students' understanding, and even cause the students' learning not to have the influence and confusion. Therefore, when creating problem situations, teachers should try to ensure the authenticity of relevant background materials and data.

(3) Principle of simplicity. The problem scenario is for the mathematics study service, it should be as simple and clear as possible in the setting and display of the situation, so that students can quickly analyze and refine mathematics information. In a class, the problem scenario is too many and too complicated, which increases the amount of useless information, and increases the burden and difficulty of students' learning. In fact, many successful mathematical problem scenarios are derivative. In a student's inquiry process, a problem scenario gradually produce a series of related, interlocking, interlocking and shallow questions, so that the concise and generative problem scenario is the efficient problem scenario.

(4) The principle of unity of humanity and science. The problem scenario in mathematics teaching is also an effective way to infiltrate humanistic thinking. For example, in the lesson of teaching "pi", a teacher leads to an inquiry into "circumference" through a story of Chongzhi Zu as a teenager. The story is like this: Chongzhi Zu played in one place, and saw the craftsman who built the house in accordance with the traditional "Wednesday Trail One" calculation method, Zu Chongzhi said next to the big. The craftsmen were very dissatisfied, and the resulting wood was a lot bigger. This problem scenario not only stimulates students' interest in exploring the relationship between circumference and diameter, but also shows the brilliant achievements of traditional mathematics research in China and the wisdom and intelligence of ancient mathematicians in China, so that mathematics learning is also full of rich cultural atmosphere.

V. The methods of Creating Mathematics Concepts to Form Problem Scenarios

Some of the mathematical concepts are derived from the practical problems of production and life, some are produced by the development of mathematics itself, and many mathematical concepts are derived from the actual life, but rely on the existing mathematical concepts. Mathematics teaching activities must be based on students' cognitive development level and existing knowledge and experience. That is to say, mathematics teaching activities should be based on the development of students, and the students' personal knowledge, direct experience and real world should be regarded as the important resources of mathematics teaching. According to the way of producing mathematical concept and the general method of mathematical thinking, combined with the cognitive characteristics of students, the following methods can be used to create the problem situation of mathematical concept formation.

(1) Use existing similar concepts to create problem scenarios for analogy discovery. There are many concepts in mathematics which have similar properties. For the teaching of these concepts, teachers can guide students to study the concept attributes that they have already learned, and then create problematic scenarios to guide students to discover. Try to define the new concept so that the new concept is easily assimilated and constructed in the original cognitive structure. The problem scenario created by such mathematical concepts

must grasp the similarities between the old and new concepts, and provide the necessary "cognitive basis" for the formation of new mathematical concepts. By analogy with known concepts (such as analogy between plane and space, analogy of finite and infinite, and method analogy, structure analogy, etc.) enable students to better and master new mathematical concepts. Of course, it is also important to note that the conclusions drawn from the analogy are not necessarily correct [5]. At this point, the teacher should guide the students to correct the wrong analogy until the correct conclusion is reached.

(2) Using mathematical concepts to create problem scenarios that lead to conjecture. There are some connections between many mathematical concepts. In the process of teaching, if we can design the contact points between the new and the old concepts into problem scenarios, and guide students to establish the relationship between the new and the old concepts, which will lead to conjecture and verification. Using conjecture and verification to create problem scenarios can arouse students' cognitive conflict and stimulate their thirst for knowledge. Teachers provide the conditions for actively exploring and discovering problems, so that students' thinking can be promoted and developed in the process of conjecture and verification of problems. It is necessary to grasp the essential attributes between the old and the new mathematical concepts in order to create appropriate fixed points for the emergence of the new concepts so as to give birth to the formation of new mathematical concepts.

(3) Using the comparison of existing related concepts to create problem scenarios of induction and discovery. Some mathematical concepts are the extension of old concepts. If we can reveal the law of concept expansion in the teaching process, we can introduce new concepts naturally. The key to the creation of the problem scenarios in the formation of this kind of mathematical concepts is to reveal the background and law of the expansion and development of the related concepts, which will easily lead to new mathematical concepts.

(4) Creating abstract and generalized problem scenarios by known emotional materials. Some mathematical concepts originate from real life, and are abstracted from the practical problems of production and life. The teaching of these concepts should be based on some perceptual materials to create abstract and generalized scenarios and guide students to refine the essential attributes of mathematical concepts. This requires teachers to design interesting and meaningful activities in combination with students' life experience and existing knowledge, to create good teaching situations so that students can move from perceptual to rational, from concrete to abstract, through comparison and classification. Abstract and other thinking activities, from which to find out the nature of a class of things, and finally through the summary of new mathematical concepts. It can solve the practical problems in life, strengthen the students' awareness of the application of mathematical knowledge, and cultivate the students' ability to solve problems with independent innovation.

Acknowledgements

The works described in this paper are partially supported by "Chinese Overseas Communications Ministry Collaborative Innovation Center-Study of Chinese Character Culture".

REFERENCES

[1]. C Gong, Mathematical curriculum and teaching theory in primary and middle schools, *Jilin University Press*, 2017.
[2]. S Xie, A study on the creation of Mathematical problem situation in junior middle School, *Learning Weekly, 28*, 2018, 103-104.
[3]. X Sun, A case study of mathematical comprehensive practical activities in junior middle school based on problem situation--a case study of in two teaching cases, *Modern Education, 6*, 2018, 103-104.
[4]. X Fun, On the construction of problem-based deep learning teaching model, *Journal of the College of Northwest Adult Education, 4*, 2018, 79-82.
[5]. J Kou, and G Lian, Promoting the teaching reform of mathematical modeling course by using problem situation teaching method, *Heilongjiang Education(Theory & Practice),Z2*, 2018, 58-59.

Ling Ling Lu "Research On Problem Scenarios And Creation In The Mathematics Classroom Of Primary Schools" IOSR Journal of Research & Method in Education (IOSR-JRME) , vol. 8, no. 5, 2018, pp. 47-50.