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Analysis of the causes and the countermeasures of the wrong identification of side view for the second-grade students in primary school

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Abstract
Observing objects from different positions is the necessary foundation for learning space and graphic knowledge. It plays an important role in helping students to establish spatial concepts and cultivate students' spatial imagination. However, in the actual teaching, we found that the second-grade students often make mistakes in the analysis of the side view. By consulting the literature, the author found that there was no research on the side view identification of mathematics in the second-grade of primary school. Therefore, this paper wants to find out the reasons for students' mistakes in analyzing the side view through investigation and research, and then propose targeted teaching strategies to help students solve the side view problem more smoothly.

Keywords: second-grade students, side view, mathematical education, mathematics learning

1. Introduction
The side view problem is the teaching content of the "Observing Objects" of unit 5 in the first edition of the second-grade published by the People's Education Press. In the actual teaching, the second-grade students often make mistakes in the analysis of the side view. However, there is no practical research on the problem at this stage. Therefore, it is particularly urgent to find out the reasons why the second-grade students make mistakes in discriminating the side view and propose a targeted teaching strategy.

2. Research review
Through the combing of relevant research at home and abroad, it is not difficult to find that the research on the three-view problem of primary school and the cultivation of the concept of space in the lower grades of primary school is still relatively in-depth, and both the teaching concept and the choice of teaching methods have something in common. For example, they all think that it is necessary to cultivate students' spatial concepts and geometric intuition. They all think that they should contact students' life experiences, use visual aids, enhance students' intuitive feelings and so on (Ding, R. Y., 2012; Dai, Y., 2005; Liang, X. L., 2017; Gao, F. G., 2015; Ping, Y. W., 2016) [1-5]. Our country's research combines China's national conditions and the characteristics of student's thinking development to enumerate many teaching methods suitable for China (Wu, Q. Y., 2016; Fang, Q. X., 2017; Wang, K., 2014; Bai, Y. W.,2018) [6-9]. But unfortunately, there is less information on the reasons for the wrong identification of side view of the lower grade students. Therefore, this is where the research needs to focus. This research is to find out the reasons why the second-grade students are wrong in discriminating the side view and propose a targeted teaching strategy.

3. Methods
On the one hand, interviews were conducted with teachers of the second-grade in primary schools. Starting from the four aspects of students' learning situation, teachers' pre-class preparation, teachers' teaching situation and after-class situation, in-depth studies were conducted to find out existing problems and analyze them, especially the causes of teachers' teaching. On the other hand, the second-grade primary school students who often made mistakes in the analysis of side view were interviewed to find out the difficulties that students had in the analysis of side view and further found out the reasons for mistakes.
This paper applied the teaching strategy of side view discrimination in the second-grade of primary school to the actual teaching, conducted teaching experiments on two parallel classes (students with the same level), and then tested the students in these two classes to detect the effectiveness of teaching strategy in the error of side view discrimination.

4. Interview results and analysis
4.1 Interview results of teachers
Through the interview and survey of teachers, the author summarized the following problems existing in the analysis of teaching side view:
1. Teachers don't provide enough observation material.
2. Teachers don't give the students sufficient time to observe and do hands-on, and more is replaced by his own presentation or hands-on operation of a few students.
3. The young teachers are not sufficiently thorough in grasping the teaching materials, and the students' learning level cannot be fully considered when preparing for the observation of the object.
4. Some teachers have a relatively simple teaching method, and they cannot fully mobilize students' interest in learning when teaching the analyzed of the side view.
5. Teachers do not pay much attention to the cultivation of students' thinking development in the teaching of observing objects.

6. Many teachers do not pay attention to "heuristic teaching". Most of the teachings are mainly taught by teachers. They do not give full play to the subjective status of students, so that students can't actively discover and learn ways to distinguish side views.
7. The learning form of the part of observing objects is relatively simple and cannot fully mobilize students' interest and enthusiasm for learning.
8. Teachers do not pay enough attention to the cultivation of students' test habits.
9. There are some deviation between the teacher's understanding of the students and the actual mastery of the students.
10. Some teachers have a single evaluation of students' answers to questions and the evaluation is not targeted.
11. Although teachers consciously begin to cultivate students' examination habits, they do not really pay attention to and implement them.
12. After-school targeted exercises to analyze side-view problems are not enough.

4.2. Interview results of students

The survey also reflected the mistakes made by the second-grade elementary school students in the analysis of the side-view problem, and the problems in the second-grade students in the analysis of the side view are as follows.

1. Students do not have a quick and correct way to observe the side of the object. When encountering problems, they often observe the most difficult side.
2. The students' thinking is not clear, and they do not understand the requirements and methods of observing objects.
3. Students have poor spatial imagination and poor hands-on ability.
4. Their first-grade related basic knowledge is not strong and comprehensive, can't form a knowledge network in the mind and flexible extraction and application.
5. Students don't develop good reading habits, and they can't read the topic requirements and keywords carefully when doing the questions.
6. Students don't develop good examination habits, and most students don't know the correct method of examination.

5. Teaching guidance strategies

According to the interview method, the author draws the reason why the second-grade elementary school students analyze the side view error. Combined with the current mathematics teaching practice in primary schools, the author puts forward the following suggestions to the teachers.

5.1 Teachers should provide students with sufficient observation materials

Teachers should carefully prepare enough observation materials so that each student can observe the side view. The observation materials should be from the familiar objects of the students, the size should be appropriate. Teachers must make obvious marks on the left and right sides, so that students can accumulate experience in observing objects.

5.2 Teachers should give students enough time for each student to fully observe the object

Teachers should arrange hierarchical observation activities according to the cognitive rules of students, and give students enough time in the classroom to encourage each student to observe objects in multiple directions, let them compare, imagine and think in observation, and gradually accumulate the experience of observing objects.

5.3 Teachers should study students and understand the knowledge of second-grade primary school students

For the teaching of observing objects, teachers must first pay attention to it and do adequate preparations. Teachers can learn about students' learning and behaviors by talking to students and observing students. This will not only confirm the students' advantages in a timely manner, but also timely understand the students' shortcomings and deficiencies, thus helping students find reasons and improve learning effectiveness.

5.4 Teachers must use a variety of methods to help students create graphical representations when observing objects

In the teaching of "observing objects", teachers should pay attention to and use a variety of methods to help students create graphical representations. For example, students can experience the process of extracting from intuitive experience to indirect experience in a variety of activities and imaginations through various forms such as "thinking," "speaking," and "painting", then get clear and complete graphic representation.

5.5 Teachers should focus on correct guidance and summary the method of side view analysis timely

In the teaching process of side-view, the teacher should continuously guide the students to summarize the methods, so that the students can clearly use the exclusion methods when observing the side of the objects, knowing to go to the simple side first, and the rest is not easy to judge or using the principle of "face-to-face observation is the opposite" to judge.

5.6 Teachers should help students to accumulate experience in observing object activities while developing their spatial concepts

When teaching the side view, the teacher should let students become the master of learning, and use multiple levels of activities to let the students observe. The teacher only needs to guide students from different angles to observe and let them gradually accumulate observational experience and recognize the relationship between the whole and the part at different levels of activities.

5.7 Let students take the lead in the study of the side view

In the teaching process, the teacher should guide students to observe, manipulate and imagine, and let them continuously establish the connection between the three-dimensional graphics and the graphic graphics in the conflicts between the cognitive illusion and the real graphics, so that students constantly participate in the process of generating conclusions and make full play of their subject status.

5.8 Teachers should improve evaluation, capture timing, and mobilize students to analyze the enthusiasm of side view in the best evaluation

First of all, class evaluation should be timely and specific. Secondly, class evaluation should pay attention to students at different levels. Thirdly, class evaluation subjects should be diverse. In the best evaluation, students' enthusiasm for the class is fully mobilized, so that they can better participate in the class.

5.9 Teachers should pay attention to the connection between old and new knowledge in daily teaching

Teachers should pay attention to the mutual penetration of teaching content in various parts, and use various forms to help students construct knowledge networks and lay a good foundation for follow-up learning.

5.10 Teachers should conduct the necessary variant training to analyze the side view problem after the new lecture is completed

For students who still have difficulty in arranging side-view problems, teachers should do counseling and stratify when arranging assignments.

6. Teaching experiment

6.1 Experiment design

6.1.1 Experiment subject

In this experiment, the students from the class four, grade two and class five, grade two of Dongfang Bilingual Experimental School of Jinan were selected as the experimental subjects. Their grades were similar, and the number was same. In the course of the experiment, the class four was used as the experimental class, and class five was used as the comparison class. Both classes were taught by the author.

6.1.2 Experiment method

The author used the regular teaching methods for the class five, while the class four used the new teaching strategy for teaching. The two classes had the same assignments.

The experiment took one week, and then the students in the two classes were tested on the side view. During the test, the two classes chose the same time, the same topic, the same scoring criteria, and finally, comparative analysis was made on the results of the two classes.

6.1.3 Data collection and processing

The test rolls were uniformly issued and uniformly recovered, and the test papers were revised according to the unified standard answers and scoring standards. Then each student's scores and errors were counted one by one, and then the scores of the two classes were statistically analyzed from the overall and sub-items, including the highest score, the lowest score, average score, score rate and time.

6.2 Experiment procedure

Beginning on November 12, 2018, and ending on November 18, 2018, a week of experimental teaching. On November 19, 2018, at 9:00 am, both classes were simultaneously tested in a unified manner. The time was 10 minutes, that is, both classes ended at 9:10.

6.3 Result analysis

By analyzing the experimental data, we found that the test results of the experimental class were better than the comparison class. From the point of view of the question rate, the rate of each question in the experimental class was higher than that of the comparison class, and the difference was most obvious in the side-view analysis. From the time of completion, the students in the experimental class were faster than the comparison class. This showed that the students in the experimental class had a good grasp of the problem of side view analysis.

7. Conclusions

It can be seen from the above experiments that after using the new teaching strategy, the experimental class students are obviously better than the comparison class when solving the side-view analysis problem, which shows that the previous teaching suggestions for the side-view analysis problem have certain effects.

Therefore, in daily teaching, teachers should strengthen their understanding of the "new curriculum standards", create a relaxed atmosphere in the class and use “gaming” teaching methods to enhance students' interest and enthusiasm, enrich teaching content and connect teaching with real life, let students experience the process of exploring mathematics and give students the opportunity to observe and learn independently. Encourage students to question and guide students to question, focus on the guidance of students' behavioral habits, cultivate students' self-confidence, make full use of information technology, strengthen individual counseling and reflect in time after class(Ministry of Education, 2011) [10].

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