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How to use the answers-searching app in middle-school mathematics teaching

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Abstract
The answers-searching App has been widely used in the middle school student. Based on the analysis of the characteristics of the answers-searching App and the requirements for solving the problem teaching in the current middle school mathematics teaching, it is recommended to objectively understand the answers-searching App, to identify the applicable problem type of the answers-searching App, and to clearly define the use requirements, so that teachers can take reasonable steps to apply the answers-searching App in the appropriate link.

Keywords: answers-searching app, mathematics teaching, problem solving ability

1. Introduction
In recent years, various types of learning application based on mobile phone have emerged one after another. Among them, the answers-searching App has been widely used in the middle school student group (He, Y. H., 2017) [1]. So how to apply the answers-searching App to mathematics teaching reasonably? Which links and content in the teaching are suitable for using the answers-searching App? What requirements should teachers follow in using the answers-searching App in teaching? These issues are worth studying. With the advent of the information age, only in-depth study of these issues can guide students to correctly use the answers-searching App in mathematics learning, thereby improving learning ability. Only by studying these problems can teachers be used to rationally apply the answers-searching App in mathematics teaching, so as to conform to the trend of the times and promote the reform of mathematics teaching more scientifically, and further improve the quality of teaching (Shen, J. X., 2017) [2].

2. Understanding of the answers-searching App
On the one hand, the answers-searching App has many advantages: (1) The answers-searching App is a huge learning resource database composed of various problem banks, knowledge points library and teaching video library, which can broaden students' knowledge. (2)The answers-searching App gives students daily counseling and basic help. It can solve the current problems of students in a timely manner regardless of time and place constraints, and help students get ideas and methods for solving problems. (3) Some parents have limited knowledge, and they can use this answers-searching App to help students learn by self-study and solve the trouble of not being able to counsel the child (Chen, X. Y. P., 2017; Liu, H. Y., 2018; Tian, Y., 2017) [3~5].

On the other hand, the answers-searching App has many shortcomings: (1) Accuracy of the answers on the answers-searching App is yet to be investigated. If the answer is wrong, it may be misleading to the students (Tian, Y., 2017) [5]. (2) The answers-searching App promotes students' lazy thinking, hinders students' independent thinking and the cultivation of independent learning ability. Some students may even rely on it and lose the ability to find and solve problems (Li, Y. N., 2015; Wang, S. Y., 2008) [6, 7]. (3) Students frequently use other social entertainment applications while learning with the answers-searching App. The use of social entertainment App during study will undoubtedly distract students' attention and make students' learning inefficiency, which will lead to the decline of students' ability to solve problems, the decline of grades, and even undermine a student's daily code of conduct (Liu, H. Y., 2018) [4]. (4) Students using the answers-searching App will lead to “work distortion”, which not only affects the formation of students' integrity and affects the teacher's accurate assessment of students (Yan, Z. J., 2017; Hu, Q. Y., 2016) [8, 9].

3. Middle school math problem solving teaching
The high school mathematics curriculum standard states: Students need to improve their ability to discover and present problems, analyze and solve problems from a mathematical perspective; learn to analyze the world with mathematical thinking, develop logical reasoning and mathematical literacy. The reform of mathematics quality education puts forward higher requirements for students' ability to solve problems. For example, “mathematical modeling” emphasizes that students are required to discover problems, ask problems, analyze problems, build models, conclusions, verify results and improve models, and finally solve practical problems. Students' logical thinking, analytical ability, and spatial imagination need to be continuously improved through the process of solving problems.

For problem-solving teaching, teachers need to do the following: (1) Strengthen students' ability to examine problems. Teachers should guide students from the perspective of the examination to enhance students' understanding of the topic. The most important thing is that teachers should pay attention to cultivating students'

understanding of the hidden conditions in the problems, and thus improve students' ability to examine problems. (2) Encourage students to solve problems using a variety of methods. For the same problem, the teacher guides the students to use different ways to obtain the final answer from different perspectives, and then compare these methods to choose the most appropriate one. (3) Strengthen the induction and collation of the right and wrong problems. Teachers should organize students to sort out and summarize the wrong problems. For the mistakes of students in the special exercises, the teachers should explain them in a targeted manner. For those errors that are easy to make mistakes, teachers and students should summarize and explore together in the classroom. Only by analyzing the wrong subject can you help students to really look at math problems (Chen, Y. H., 2018) [10]. (4) Innovative teaching methods and mathematical thinking. Teachers should take appropriate measures to avoid the occurrence of students' thinking mode, focus on innovation and cultivate students' innovative consciousness and ability in the teaching process and teaching content. Teachers should help students develop from one-way thinking to multi-directional thinking, from positive thinking to reverse thinking, from conventional thinking to ergonomic thinking.

Polya clearly pointed out that students' problem solving should be divided into the following four steps: the title of the problem, the initial plan, the implementation, review and summary. Therefore, students should do the following in problem-solving learning: (1) Enhance students' ability to examine the meaning of the problem. Students must carefully read the As before they solve the problem, master the relationship between the known conditions and problems of the problems, find the key words and key quantities, and explore the hidden conditions in the problems. By tidying up these conditions, students quickly clear their minds and begin to solve problems. (2) Grasp the idea of solving problems. More important than getting an answer is to understand the mathematical thinking methods examined in the topic. It is more important for students to understand the mathematical thinking methods examined in the problems than to get the answers, for example, the combination of number and shape, transformation and return, function and equation, and classification discussion. What students learn through problem-solving learning should be the method of thinking and its flexible use. (3) Keep thinking independently. Students should develop their own independent thinking skills in problem-solving learning. Only through independent thinking can they understand the topic more thoroughly. (4) Improve the ability of the type of induction. In the problem-solving learning, students must learn to sort out the completed topics, return to the knowledge points and mathematical methods contained in the problems, and classify them into groups to help them to learn to migrate.

4. How to use the answers-searching App in teaching

Through the understanding and analysis of the characteristics of the answers-searching App and math problem solving teaching, I think it is reasonable to apply the following measures in the current mathematics teaching.

4.1 Applicable problems in the teaching of the answers-searching App

According to the previous analysis of mathematics problem solving teaching for students, I think the answers-searching App is more suitable for teaching and answering the following types of problems.

a) Application model problems

The application model is a problem in which students use the knowledge they have to build mathematical models to solve practical problems. On the one hand, such problems are generally closely related to life, such as the “interest problem” in secondary schools, and students may have difficulty understanding the meaning of the problems (Xu, X. Y., 2014) [11]. The answers-searching App can provide students with a good background to answer these problems and help students better understand the hidden information in the problem. On the other hand, the modeling ability of middle school students is in its infancy. Through the answers-searching App, students can find out in more details how they can be considered in the process of building mathematical models and answering problems, thus refining their own ideas, such as the scope of the domain.

b) Thinking training problems

Thinking training problem is to avoid students' rigid thinking and rote memorization. This kind of problem is generally difficult, and it needs to apply the ideas of reverse thinking, classification discussion, analogy induction [12]. Because the problem-solving ideas of this type of problems are more innovative, students may not have ideas for solving problems. The answers-searching App can provide a certain problem-solving idea for students who have no idea, or provide a variety of thinking angles for students who have already had certain ideas.

c) Open-ended problems

The open-ended problem corresponds to the traditional closed-ended problem, which refers to the problem that the condition of the subject is incomplete or the result of the topic is uncertain (Ren, Y., 2014) [12]. Because the free play of this kind of problem has a large space, the answer is not the only one, so at this time, after completing the answer, the student can use the answers-searching app to search for other answers that are different from their own. Students can think carefully about the solution to other answers to divergent thinking.

4.2 Requirements for the use of the answers-searching App in teaching

a) Direction

Teachers need to be fully prepared before using the answers-searching App and cannot be used blindly in teaching. Teachers should be clear about which problems, content, and links are suitable for using the answers-searching App, and use the answers-searching App in a targeted manner to determine key content. Students need to be aware of their weaknesses and identify where they are suitable for using the answers-searching App.

b) Moderate

In the teaching, the answers-searching App cannot be overused and cannot be abused; the teacher needs to grasp the "degree" of using the answers-searching App. Teachers can't focus too much on the use of answers-searching App. It is necessary to keep in mind that students are the main subjects of learning. Teachers must not neglect the fundamental purpose of teaching in pursuit of the use of answers-searching App. Students should also use the answers-searching App in moderation during the learning process to ensure that they have independent thinking about the problem.

c) Diversity

Students need to take full advantage of the features of the answers-searching App, not just search answers. At present, the answers-searching App has developed a variety of functions, such as video explanation, wrong record book and other functions (Chen, X. Y. P., 2017) [3]. Students should fully explore the functions of the answers-searching App to promote their own mathematics learning. Teachers should have innovative thinking in the teaching process and need the ability to process and apply information. On the one hand, innovative teaching methods can be made by using the search for the App. On the other hand, the data provided by the answers-searching App can analyze the current learning situation and weak links of the students.

d) Concentration

Students need to improve their level of concentration when using the answers-searching App, and they cannot use other entertainment App while using the answers-searching App. The degree of student concentration largely determines the state and depth of thinking. Therefore, when using the answers-searching App, the use of other entertainment App must be strictly restricted. Otherwise, the learning efficiency will be reduced and bad habits will be generated.

e) Questioning

Students should learn to problem the answers presented by the answers-searching App, rather than receiving it in its entirety. Currently, the answer to the answers-searching App does not guarantee a 100% correct rate (Tian, Y., 2017) [5], so students should problem the answer process and answers given during their use. Solving problem can not only improve students' critical thinking, but also enable students to maintain a rational judgment on the answer.

4.3 The use process of the answers-searching App in teaching

Teachers should plan the classroom content in the preparation stage, classify the problems involved in this lesson and the solutions they use, and select the problems that apply to the answers-searching App. Before the class, the teacher should formulate more detailed rules in the class according to the usage requirements above, in order to better exert the positive influence of the answers-searching App. At the beginning of the classroom teaching, teachers need to remind students that some topics need to be answered using the answers-searching App, so that students can prepare accordingly.

In the classroom teaching, when going to the link that needs to use the answers-searching App, the teacher should guide the students to use the answers-searching App. In this process, students are strictly prohibited from using other entertainment software while operating the answers-searching App, strictly forbidden for students to skip the answer process and read the answer directly. Teachers should guide students to use the following steps: (1) Examining the problem carefully, check whether there are conditions or definitions that you do not understand, and if so, use the answers-searching App to search for relevant content until you can fully understand the meaning of the problem. Organize the information in the title to prepare for the second step. (2) The students independently think about the answering process, which mainly includes the knowledge points and thought methods used in solving the problems, and constructs the problem solving framework (it doesn't matter if the answer is not solved, the key is to guide the students to think independently and have their own ideas). Students use the answers-searching App to search for problems after this stage of thinking. (3) Students compare their own problem-solving ideas with the answering process in the answers-searching App and observe whether the ideas are consistent. If they are inconsistent, compare the differences and record them. Think about which method of solving the problem is better and where it is. (4) Students will answer the problems in detail, and then compare them with the detailed answer process on the answers-searching App to see if they have considered the details. Finally, the answer is consistent. If there is any inconsistency, the student will conduct an inspection or a group discussion to verify. (5) Guide students to summarize the problem-solving process, including the problems encountered in the whole process, the inspiration or promotion obtained through the search for the App, and the opinions on the results of the search results.

After the application of the answers-searching App, the teacher should summarize the teaching content and other problems, not only to summarize the experience of using the answers-searching App, but also to summarize the feedback of the students on the use of the answers-search App. After the end of the classroom teaching, the teacher needs to use the answers-searching App to perform hierarchical layout work, and make full use of the intelligent push function of this App, so that students with different knowledge mastery can practice according to their actual situation.

The following steps will be explained in conjunction with specific examples:

A product manufacturer produces a product, and for each such product (100 units), the total cost is G(x) (ten thousand Yuan). The fixed cost is 420,000 Yuan, and the production cost per 100 units is 150,000 Yuan. Sales income R(x) (ten thousand Yuan) satisfied that. Assuming the production and sales balance of the product, according to the above rules, answer the following problems:

1) Write the analytical expression of the profit function y=f(x);
2) To make the factory profitable, to find the range of production x;
3) How many products can the factory produce, which can make the maximum profit?

In the first step, many students are not clear about the concepts of “total cost”, “production and sales balance”, “profit, profit” when answering this problem. Therefore, you can use the answers-searching App to search for relevant explanations and understand the meaning of the problems more accurately. Students can check through the answers-searching App: production and sales balance means that the products produced can be sold; Total cost = fixed cost + production cost; profit = sales revenue - total cost.

In the second step, the students analyze the meaning of the problem, analyze the topic, and sort out the problem-solving ideas. The first problem is based on comparison, and the analytic formula can be listed according to the definition of profit. The second problem emphasizes that there is profit, that is to say, the profit is greater than zero, so it is necessary to column inequalities to answer problems. The third problem belongs to the most value problem, and may be based on the nature of the function to find the maximum value, or may be solved according to the derivative.

In the third step, the students search through the answers-searching App and compare the ideas with what they think. As the third problem, students may be more likely to think of using the nature of the quadratic function to find the maximum value, and the derivative can be solved. At the same time, students also need to pay attention to the details of the lack of thinking. The sales income R(x) in this problem is a piecewise function, whether it is discussed in the case of a case, and whether the domain is discussed. These comparisons with the search results of the answers-searching App can be found and improved by the students themselves.

In the fourth step, the student answers the problems in detail and calculates the answers. Then compare the answers in the answers-searching App to see if they are consistent. If they are inconsistent, check again or discuss the group.

In the fifth step, students summarize this process, how to think about the application of the elementary function model, and how to choose the appropriate solution method.

5. Conclusion

The reasonable use of the answers-searching App in teaching is of great significance. Teachers can apply the answers-searching App to the appropriate type of teaching and self-preparation, assignment and correction. Students can also use the answers-searching App to learn independently. However, the generation and development of anything requires time and practice. The application of the answers-searching App also needs to adhere to the fundamental principles of learning and improvement in the process of practical exploration, thus playing a greater role.

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