The application of thinking guide map in mathematics teaching in junior middle school

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Abstract

In the traditional mathematics teaching, confined to the teacher, the students listen to the mode, the students are not interested in the classroom, because fatigue will gradually lose the enthusiasm of learning, cultivate their creativity and improve the learning efficiency is not good, but not up to the optimization of teaching objectives. In the new classroom use think guide map, improve the enthusiasm of students, classroom participation has improved significantly, can play its own advantages in the group inquiry and learning tasks, and participation is not high students in the traditional classroom, using mind map. The students' personal strengths are stimulated, in the classroom is no longer the teacher walked into the classroom, but rather, into the group, in cooperation in the study. Through comparative experiment and after class questionnaire analysis, we find that mind map can better optimize teaching and improve teachers' teaching quality and students' personal qualities.

Keywords

Teaching of Thinking Guided Map; Mathematics Learning; Group Inquiry; Optimizing Teaching.

1. Introduction

With the rapid development of information technology, the traditional classroom teaching model is gradually unable to meet the teaching requirements. In traditional mathematics classrooms, teachers often use the form of "blackboard" + "chalk" to carry out teaching. The classroom is monotonous and boring, students are inattentive, and their participation in the classroom is not high. It can't help students' interest in learning and the cultivation of creative ability. Mind Map can visualize the teaching content concretely, and the text language can be transformed into a graphic language. The classroom is more lively and interesting, and full of appeal. Students are more willing to actively participate in learning, and learning is no longer boring and boring, which can improve the classroom teaching effect of teachers and students' creative ability and the cultivation of it has a promoting effect.

Mind mapping software is a visualization tool. In the process of making mind maps, students can help establish a knowledge network and form a system framework under the premise of determining the central theme. Mind mapping is especially effective in math review classes. For example, under the premise of the central theme of triangles, students can give full play to their creative potential, not only master knowledge points, but also cultivate aesthetic ability and enhance imagination.

As multimedia becomes more and more popular, the perfect combination of multimedia and traditional classrooms can often produce different teaching effects. In traditional classrooms, teachers blindly instill knowledge, and students become passively learning, unable to achieve the expected teaching effect. In order to truly realize the transformation of teachers as the

leading students as the main body, deepen the teaching reform, through mind mapping, it will have a significant effect on the cultivation of students' interest in learning and creative ability.

2. Mind Mapping and its Application Principles

2.1. Mind Mapping

The mind map was proposed by British psychologist Tony Bazan in 1970. It is very similar to the shape of a tree, with the main and the branches and leaves, that is, the main content and derivative content. Starting from the main key points, the extended content is gradually introduced, showing a figure that extends from the center to the surroundings. The mind map has its own unique charm. In the design of the mind map, you can add your own design concepts on the basis of the primary and secondary content, such as the changeable shape and color, and you can also replace the structure of the entire mind map. The introduction of the concept of mind map in middle school mathematics can exercise students' innovative ability and greatly improve their learning methods and strategies. It is not only a fixed mode of learning, but also can increase students' interest in learning. Whether in mathematics teaching activities or review classes, mind maps can well improve students' logical judgment thinking.

2.2. Features of Mind Map

Targeted and practical. Most of the mind maps are aimed at a knowledge point or a lesson, and they are more targeted. Summarizing the research papers related to the mind map generally have a fixed format, including research summary, case design, and teaching effect analysis and comparison. The research objects involve most subjects, and mathematics is no exception.

Strong language. Mind maps are influenced by linguistic research methods and show strong linguistic research value [1]. Although the mind map and language look completely different, one is carried out according to the spatial grammar and the other is carried out according to the law of time, but effective language can guide the research of the mind map. At present, our country is conducting preliminary research on mind mapping.

Imperfect system. Although the mind map has formed its own system, it still needs to rely on the concept map. The research on it is mostly carried out under the teaching framework of the concept map heuristic teaching theory, teaching evaluation and knowledge system construction.

2.3. Principles of Application

Principles of thinking training. Mind mapping can be a teaching tool or a learning tool for students. It will ultimately be based on the students themselves. Mind mapping can better cultivate students' innovative thinking and is conducive to students' thinking training.

Principles of structured knowledge teaching. Mind maps can structure knowledge points, have a very good effect on the construction of knowledge networks for students, and can deepen students' understanding of knowledge.

The principle of problematic knowledge. Help students build a knowledge framework and gradually refine a big problem into smaller ones. To help students have a set of personalized methods for understanding knowledge, so as to mobilize the classroom atmosphere, expand thinking, and improve classroom teaching effects.

3. Application Cases and Effect Comparison of Mind Map in Junior Middle School Mathematics Triangle Teaching

3.1. Introduction and preparation of mind mapping software

3.1.1. Software introduction

XMind is a very easy-to-use software[2]. It is easy to get started for most users, and can help users sort out their ideas and quickly find the key points of the problem. The ease of use of the mind map lies in its simple operation and strong creativity. The basic production process can be completed by dragging or clicking with the mouse. Its structure diagram includes mind map, balance diagram, organization chart, tree diagram, logic diagram, fishbone diagram and matrix structure. XMind is easy to operate. First, you should double-click to open the desktop software cursor and select the central theme; then double-click the central theme to change the font, including more diversified processing of font styles, for example, changing the font size, font style and color; the premise of determining the central theme Right-click and select Insert subtopic, the system will automatically add connecting lines to the mind map to form a regular network map. If you want the mind map to be more vivid and personalized, you can right-click and select to insert a picture. Under the personalized design of pictures and colors, XMind enables students to develop their innovative abilities, thereby improving learning and work efficiency.

3.1.2. Preliminary preparation

The application of mind mapping in junior high school mathematics teaching must first be closely related to mathematics teaching. It can be based on the content learned in this lesson or the last few lessons, and prepare from the following aspects:

Start with the concept. First determine a keyword, such as triangle, circle, inequality, etc. For the branch of keywords, mathematical concept modules can be designed to help students understand mathematical definitions. For example, first confirm the central theme of triangles, and then the next sub-theme can be divided into right triangles, acute triangles, isosceles triangles, and obtuse triangles. With this sub-theme, we need to understand the definition of a right triangle, which is the prerequisite for mastering the entire knowledge point.

Start from the knowledge points. In the teaching design of mind map, teachers must first grasp the framework of the entire knowledge points, guide students to master the knowledge points of the entire chapter, not only can help students build a knowledge network, but also can improve students' divergent thinking and innovative ability.

Start with learning methods. Guide students to master and experience mathematical ideas and methods, design mathematical notes, easy to make mistakes and difficult points, help students summarize learning experience and experience, and let students gradually cultivate mathematical logical thinking to establish a knowledge-organized mind map. This is very important in the entire learning process of students. Mastering mathematical ideas and methods can often achieve a multiplier effect with half the effort.

3.2. Application Cases of Mind Map in Junior Middle School Mathematics Triangle Teaching

3.2.1. Production process

Mind map structure design. First of all, we must determine the teaching content and links. The selected content must conform to the syllabus, conform to the students' cognitive level, cognitive psychology and learning interest. It has effects and functions for students of all stages.

Mind map content design. In terms of content selection, we must follow the principle of unifying optimized teaching and auxiliary teaching, and design teaching content in a targeted manner. In this mind map teaching, the text is combined with the icon picture, and the color matching is

coordinated. The purpose is to make the classroom not dull and rigid, and to create a positive and interesting learning atmosphere. For example, in the creation process of students in groups, try to allow children to use colored pens and graphics to express words, so that not only can they give play to students' creative ability, but also find the joy of learning, and lay a solid foundation for further learning of mathematics in the future. For teachers, if there are multiple solutions to a problem, all of them will not only waste time and energy, but also easily distract students, which will not improve the teaching effect. On the contrary, by using mind maps in the classroom, you can express what you want to say in a simple and easy-to-understand way. Students are easy to accept and choose the learning content in a personalized way, instead of the traditional classroom "cracking duck" teaching, which can get twice the result with half the effort. The role of. The content of the teaching design of "Triangle" mind map is shown in Figure 1.
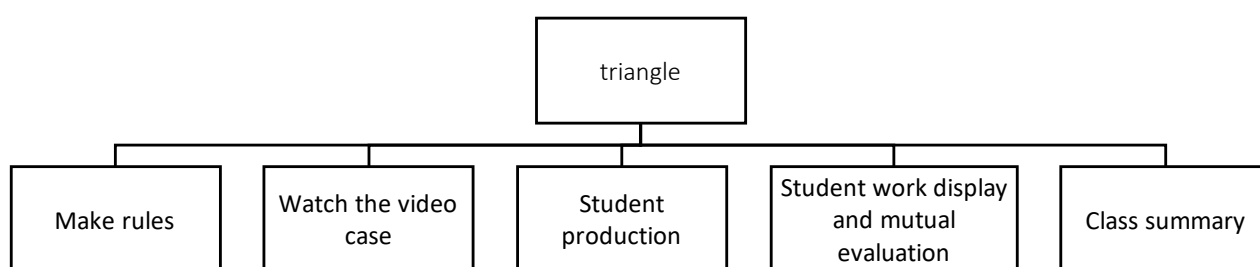

Figure 1: Triangular mind map instructional design

Generate mind maps in different formats. In order to meet the learning needs of different learners, it is necessary to consider generating mind maps in different formats. XMind supports the generation of many formats, such as pictures, plain text, HTML, etc. These formats enable learners who have not installed mind mapping software to have more opportunities to participate in learning and give full play to the main role of students. Breaking through the traditional classroom teaching model, making technical means and teaching content complement each other, and not too much emphasis on technology and ignoring the teaching goals, this will not play a role in improving teaching effects and internalizing knowledge.

Things to pay attention to when making a mind map. In the process of making a mind map, not only the leading role of teachers must be considered, but also the main role of students must be fully brought into play. In the process of creating students in groups, cultivate students' divergent thinking and brainstorm. Teachers must not set limits on students, and do not overly comment on the content and results of students' creation. As for the problems encountered by students in making the mind map, teachers should promptly guide, answer students' questions, and encourage students to complete them independently. In the evaluation link, organize student groups to evaluate each other so that students can truly become the masters of the classroom and participate in the learning tasks of the classroom.

3.2.2. Teaching process

Make rules. Take "triangle" as the central key word, and design the mind map on this basis; six people form a group, five groups in total, one group leader is selected in a group group; use colored pens, white paper, ruler, etc. Make tools with as many graphics as possible, less text, more colors and less black; each group can first determine a theme or design concept, for example, use a big tree as the prototype of the design, and select a student representative in the group to speak after the creation is completed. Show the work of this group to the class, explain the design concept and canvass for the work of the group; the time is 20 minutes, the time ends, and the students are required to sort the work and return to the original position.

Watch the video case. Since the students in the junior and middle school stages may not know much about mind maps, after explaining the rules, use a five-minute micro-class to briefly introduce the concepts and precautions of mind maps, and show other excellent mind map works in small videos. This is convenient for students to open their minds, expand their thinking, save time for the next stage of the creative process, and more importantly, stimulate students' interest in learning.

Students create. After watching the micro-classes, the students' creative enthusiasm was fully aroused, and they were immediately involved in the creative process. In the process of student production, the problem encountered is: students do not have a firm grasp of knowledge and cannot list the sub-topics completely; most students can actively express their opinions and opinions, and for students who are more introverted, they choose to "Watch the battle" next to it. At this time, the teacher should deal with the problem promptly. For the first problem, the teacher should appropriately guide the students to recall the knowledge points, and can also guide the group members to brainstorm and recall together. Regarding the second question, teachers should inspire introverted students to integrate into group discussions. Students who are often not good at talking have the potential for innovation and guide students to draw and refine text with full passion.

Student work display and mutual evaluation. When the time expires, ask the students to sort their belongings and return to their original positions, start from the first group to show their works, each group has three minutes of reporting time, and canvass for their own group. After all the six groups were displayed, they started voting on the spot, and selected student representatives to comment on the works of other groups, and finally selected the "Best Mind Map Creation Award" based on the number of votes.

Class summary. After the award certificate is issued, the teacher will make a class summary. Teachers should correct the evaluation of each group in time, clarify the learning goals, and finally achieve the teaching effect. Let students reflect on learning based on this mind map class, and guide them to not only grasp the key and difficult points of knowledge, grasp the knowledge framework, but also fully understand the details of each sub-theme. For example, the definition of a triangle, although the content of the definition is not specifically presented on the mind map, the students can quickly recall what the specific definition is.

3.3. Analysis of the Effect of Mind Map in Junior Middle School Mathematics Triangle Teaching

3.3.1. Questionnaire about Mind Mapping Classroom Teaching

The questionnaire is mainly aimed at the application research effect of the mind map in the eighth grade mathematics class of junior high school. The experimental group used the mind map to carry out teaching activities, and the control group carried out the teaching activities in the traditional way of teaching. The specific content of the questionnaire is shown in Table 1.

Table 1: Three Scheme comparing

Questionnaire title	Questionnaire on the Teaching of "Triangle" Mind Map
Questionnaire description	Take the junior middle school mathematics triangle as an example, the traditional classroom and the use of mind maps to carry out teaching, the teaching effect of the two is contrasted
Survey object	8th grade students of junior high school (65 students in each class with traditional classroom and with mind map teaching)
Number of questions	10

Questionnaire preview link	http://www.51diaocha.com/w/1493395.htm

Compared with traditional classrooms, students' enthusiasm is greatly improved by using mind maps. Students are more willing to do it on their own, especially in the group presentation session, where the pride and collective honor of the students are maximized. Therefore, students are more willing to integrate into the classroom with the use of mind mapping in the classroom.

3.3.2. Learning interest analysis

The analysis of the degree of improvement of students' interest in learning is shown in Table 2.

Table 2: Analysis results of learning interest

Class type	interested	Not interested
Mind mapping classroom	92.3%	7.7%
Traditional classroom	23%	77%

Through data comparison, it can be found that in traditional classrooms, 23% of students think they are interested in the classroom, 77% of students are not interested in traditional classroom teaching methods, and are prone to fatigue; while in classrooms that use mind maps, 92.3% of students think that the classroom is lively and interesting, and they can participate fully in classroom activities without feeling tired or boring. Only 7.7% of students think that the mind map will make people feel tired and have no interest in learning. The teaching resources produced by the mind map fully integrate text and images, teaching and games, which can stimulate students' interest in learning to a large extent, and exercise their creativity and innovation ability.

3.3.3. Student's preference

Table 3 shows the analysis of students' like degree.

Table 3: Student likes analysis result

Class type	like	dislike
Mind mapping classroom	95.4%	4.6%
Traditional classroom	32.3%	67.7%

It can be intuitively observed from the above picture that in the classroom using mind mapping, 95.4% of students like to learn in games and can actively participate in learning activities. Only 4.6% of students think that this lesson is correct. Classes do not like or are interested; and in traditional classrooms, more than two-thirds of the students are unable to devote themselves to learning, and do not agree with the traditional teaching mode of teaching students to learn. Therefore, it can be seen that students are more willing to participate in lively and interesting classes, and classes that use mind maps meet this point. Students actively participate in learning activities, and the awareness of group cooperation and inquiry is strengthened. If the classroom is dull and boring, students will run away, leading to worse and worse learning effects, and students will gradually become bored, and naturally they will not play the role of improving teaching efficiency.

3.3.4. Analysis of Students' Innovative Ability

Table 4 shows the degree of improvement of students' innovative ability.

Table 4: The analysis result of the improvement degree of students' innovation ability

Class type	yes	no	do not know
Mind mapping classroom	83.1%	0%	16.9%
Traditional classroom	12.3%	58.5%	29.2%

It can be clearly observed from the above picture: in the classroom using mind mapping, 83.1% of students think that mind mapping can improve their own innovation ability, and 16.9% of students are not sure whether this kind of classroom can cultivate innovation ability. There is no clear understanding of this. In addition, none of the students deny that the mind-mapping classroom cannot improve innovation ability; while in the traditional classroom, the students just follow the teacher's pace, without their own ideas and opinions. Only 12.3% of students believe that traditional classrooms are useful for cultivating innovation ability. More than half of students believe that traditional classrooms cannot cultivate creativity, but can limit the development of thinking. 29.2% of students don't know whether traditional classrooms can help their learning and growth. . From the comparative analysis of the above data, it can be clearly seen that in the classroom that uses mind mapping, students' creative ability and creative spirit are enlarged, and they use mind mapping to sort out knowledge points. Under the impact of color and graphics visualization, students The learning enthusiasm of the students is obviously improved, and gradually the students' academic performance and comprehensive ability will gradually improve.

4. The Process Superiority of Mind Map in Junior Middle School Mathematics Teaching Design

Figure 2 shows the application value of mind maps in junior high school mathematics.
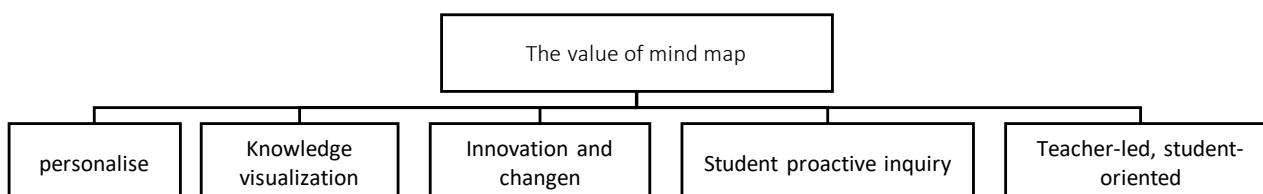

Figure 2: The Application Value of Mind Map in Junior Middle School Mathematics Teaching

4.1. Personalise

Mind mapping and personalized teaching are related to each other, and both focus on the development of "people". Mind mapping regards the user as a "person" with an open mind, rather than an object that passively instills knowledge [3]. Mind mapping focuses on the individual development of people, allows students to have their own opinions and ideas, and has a strong personal touch. Using mind maps, students can recall the knowledge points they have learned around the central theme, organize the chaotic knowledge planning into a ruled knowledge network system, and deepen their understanding and memory.

4.2. Knowledge visualization。

Mind map is a kind of knowledge visualization tool [4]. The essence of knowledge visualization is to display knowledge in the form of diagrams, forming a direct form of external expression. Teachers use mind maps as a knowledge visualization tool to carry out teaching, which can turn

text language into image language, which is convenient for students to understand and master, so as to achieve the goal of efficient learning.

4.3. Innovation and change

Compared with traditional classroom instillation teaching, mind mapping is innovative and transformative. Mind mapping Mind mapping strengthens the modernization of education and teaching, and combines education with the Internet. The essence of the classroom has changed. It is no longer the teacher's own classroom, but a student-led classroom.

4.4. Student proactive inquiry

After the teacher has formulated the rules, it is a process in which students take the initiative to explore and internalize knowledge. Students carry out activities in groups, which can not only give play to their strengths, but also brainstorm and learn from each other's weaknesses. In an exploratory classroom, teachers should not spend more than one-third of the teaching time, and students should spend no less than two-thirds of the learning time. With the gradual deepening of curriculum reforms, students' autonomous learning ability has been strengthened, which has also laid the foundation for educational information.

4.5. The teacher is the leading, the student is the main body

Gradually transform the classroom teacher's indoctrination teaching method, so that students can truly become the masters of the classroom. Entrusting the classroom to students can not only improve students' enthusiasm for learning, but also actively internalize knowledge. In-depth integration of mind mapping and traditional classrooms, truly personalized teaching and learning.

5. Conclusion

The core purpose of mind mapping is to stimulate and organize thinking, and the method used is "non-linear notes diverging from the center to the surroundings" [5]. Applying mind mapping to teaching activities and students' learning activities, teachers can grasp the entire teaching design process and form a knowledge framework in their minds. For students, they can diverge their thinking in learning activities, mobilize learning enthusiasm, truly participate in teaching activities, and play a role in optimizing teaching.

The data from this application research shows that the classroom using mind mapping is more lively and interesting than traditional classrooms, and the dominant position of teachers and the dominant position of students have been consolidated. It can be concluded that the mind map can be used as a teaching tool to be applied to teaching design, which is more convenient and efficient. It is a rare teaching resource tool.

Therefore, the mind map cannot exist independently of the traditional classroom. Only the combination and integration of the two can achieve a higher teaching level and teaching requirements. The combination of traditional classroom and mind map can not only make up for the rigid teaching mode of traditional classroom, but also optimize the classroom. In this personalized teaching environment, it can truly improve the teaching level of teachers and the learning initiative of students.

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