# Cognitive Features of Students Who Are Tired of Learning Geometry

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**ABSTRACT**：The purpose of this paper is to analyse the cognitive features of students who are tired of learning geometry， explore ways to help them overcome the disgust. The method is: analyse the cognitive features and interests of students who are tired of learning geometry, then as result, through the above analysis, we found that if we want to find a way to transform geometry learning from the perspective of interest into a way that students are interested in, we can use the methods, tools and means of simplifying, to take positive actions against their fears and boredom, especially to eliminate cognitive problems that lead to student misunderstandings. The significance lies in: let the students know if the misunderstanding are eliminated and the features of the cognitive knowledge of the geometric language are clearly defined, they are always interested in geometry learning, never feel tired. This could be realized through creating interesting connections among graphic language, natural language and symbolic language, finding out the cognitive ways in which students can be interested in geometry learning and improve their interest in learning.

**KEYWORDS:** disgusted emotions; geometric language; cognitive features; interest cultivation

## 1 Introduction

Plane geometry is one of the most basic and important subjects in developing junior high school students' thinking ability (including intuitive thinking, logical thinking and innovation). In the specific age of junior middle school students' growth, no other subject could replace it inland and abroad (Fangqu Xu, Wen Xu, 2017).
However, plane geometry is precisely a subject that is difficult for teachers to teach and students to learn for a long time. In this paper, we will try to explore and analyse the reasons why students are bored with mathematics' weariness, and then find some feasible solutions to conquer it.

## 2 Cognitive features and interests of students who are tired of geometry learning

Beginning with some examples between the teacher and the student in the reality.

1. Near the senior middle school entrance examination, one student went to the game shop because he hated mathematics classes, the persuasion and education from the parents would not help. It is thoughtful that he was even an “outstanding” student of the school.
2. In one classrooms, there was a loud noise like “how dare to swear me” and “Who told you to throw my book” “Whose exercise is not complete?” Afterwards, it was a farce that a student was criticized by his head teacher for his incomplete math homework.
3. In a classroom, teachers told the students that the circumference is a certain point to the equidistant point on the same plane. The students copied in the notebook, but did not understand what the circle was, after the teacher took chalk to draw a circle on the blackboard. The students cheered immediately: Aha, that’s the circle, understand!

So, if we analyse the phenomenon coming from the above mentioned examples and reality, we could come the conclusion that the students who are tired of geometry learning are normally:

1. Will not learn
2. Can not learn
3. feel that mathematics is boring
4. don’t establish a good foundation since the beginning, so that all the following series of problems can’t be understood and solved

But, if we talk with these students, we can find that they are interested in many things except geometry learning, like play games, watch TV, play basketball/football, dancing, chasing stars, etc. All these things bring them interest and fun, they never feel tired or bored by doing these things.

## 3 Way to transform geometry learning from the perspective of interest for students

Against above mentioned problems, after research and praxis in several schools, we come to the conclusion that following methods, tools and means of simplifying could have effect, to take positive actions against students' fears and boredom, especially to eliminate cognitive problems that lead to student misunderstandings.

1. Choose the teaching mode and build a good classroom atmosphere
   The first thing that should be done is that teachers should choose the teaching method scientifically from the cognitive basis of the students according to the characteristics of the teaching materials, and choose the teaching method suitable for the students' appetite. For example, the teaching method like "teacher-student interaction" and "small step walking" provides teachers way to cut a relatively difficult problem into smaller questions so that the problem would be easier for students to understand. All students could follow teacher's thought, they are possible to raise their hand to ask, use their brains, and learn what they want to learn in a relaxed classroom atmosphere. Of course, we should also pay attention to the students' actual knowledge accepting ability to avoid simple copy. In recent years, China has advocated quality education and innovative education, several new mathematics teaching methods are invented. We could have a wide range of teaching methods to choose, such as "exploratory mathematics teaching", "mathematics questioning teaching", "activity-based mathematics teaching", "opened mathematical teaching", "entire and example teaching", "mathematical modelling teaching", etc., Anyway we should avoid the adopting of a monotonous teaching method and having lessons in a dogmatic way.
2. Second, meticulously design teaching links to stimulate students' curiosity
   After choosing the appropriate teaching method, the second factor that we should consider is how to design every teaching step meticulously, cultivate students' positive attitude by mathematics, and consciously strengthen the connection between teaching content and real life so that each student can feel that the things to learn are practical or have learning value. For example, to find similar items, teachers send algebraic signs to students. One student in each corner of the classroom holds a sign. Other students look for "similar items" in the four corners. Although in classroom it's a little chaotic, this simple activity motivate the students' interest in learning mathematics in a pleasant atmosphere. Another example is the concept of variance learning, teacher takes a weight to the class, picks three students with similar size to weigh, write down the numbers, calculate the average and variance according to the formula. Then picks the weight of the three fattest/thinnest/average classmates and calculate the average and variance. The results shows that the average number of students in the two groups is similar, but the variance is very different. This activity enables students to feel the significance of the

variance and will never forget it. Like these wonderful scenes, it can both attract students and connect them with new knowledge, allow them to experience the establishment of knowledge points themselves. The understanding of the whole story of the knowledge point could inspire students' curiosity and receive a multiplier effect.

3. Third, establish a good teacher-student relationship
   In the teacher-student relationship, the teacher plays a leading role in the adjustment. The teacher's facial expressions should reflect equality and democracy. First of all, a teacher's single action and smile can infect students and make students feel emotional and excited. Especially in class, the teacher stands on the podium, with a kind face and a smiling face to relieve the student's nervousness. Secondly, mathematics teaching is often carried out through problem solving, through problem solving to develop students' ability to analyse and solve problems. When students make mistakes, teachers' eyes should be strict and sincere; when students make progress, they should be praise and trust. In particular, some backward students should not be treated with contempt, disgust, or disdain. This will damage their self-esteem and cause them to develop rebellious attitudes. Instead, they should be looked with hope and trust to let them see hope and increase their strength. Students in the learning process will inevitably be influenced or tempted by social family or classmates, interfere with normal learning emotions, and having some malignant consequences such as learning weariness and playing truant. At this time, we should not shout loudly, and make simple judgement. Instead, we should get to know the origin of the problems, and help students overcome difficulties and regain the joy of learning. Only by understanding students and paying attention to students in an equal, democratic manner and emotion, students can then respect and like teachers from the bottom of their hearts. Then students can be converted from like mathematics teachers to like mathematics. Let the students know that the teacher treats them sincerely and truly. This will greatly enhance the emotional communication between teachers and students.

## 4 Case Study

This is an ordinary middle school in Qingpu District of Shanghai. It has a strong team of teachers who love to study assiduously. However, in terms of teaching concepts, teaching abilities, and the quality of students, etc., there is still a certain gap compared with many advanced regions and schools. Particularly, it is always felt that the teaching of plane geometry is a difficult point in teaching and it is a "bottleneck" that restricts the improvement of teaching quality. For a long time, plane geometry has been a difficult task for teachers to teach and students to learn. While the school was thinking hard and looking for a "breakthrough" in the study of geometric teaching, in September 2011, the Municipal Education Commission of Shanghai identified this school as an experimental application of "Geomking –

junior middle school plane geometry learning software" (abbreviated as "Geomking" software)in the Shanghai Rural School Education Information Technology Promotion Project. From October 2011, this school began to learn and use the "Geomking" software.

For this reason, according to the requirements of teaching and research, after the teaching content and teaching goal of each lesson are determined, we abandon the practice of finding the exercise in the sea of books, but select the exercise from the "Geomking" software as the teaching content and guide students to gradually achieve the learning goals. The "smart search" function by "Geomking" software is the most intelligent function of the software. By simply input very simple information, it's possible to search for all the required learning content or topics in a very short time, so that teachers and students feel very convenient when using them.

By example explanation, the solution is generally presented to the students directly. Instead, they are asked to discuss the matter first, to understand how to think after receiving the problem, and it is normal when they meet problems during the thinking. The conversation of thinking and hypothesis produces a motivational effect by students' thinking, the teacher gives appropriate guidance, and displays or let students read the corresponding content in the software in a timely manner to achieve students' initiative learning and independence. Independent thinking is an important foundation for knowledge construction; teamwork, discussion and communication are effective links to promote internalization, deepening, and improvement of knowledge. The learning outcomes produced by different learning methods and the effects on student development are different.

Through nearly a year of teaching, research, and practice, we have achieved certain results and experience, which has made our mathematics teachers' teaching ability and teaching level significantly improved, so that they can adapt to the requirements of cultivating students' geometric analysis ability in teaching.

## 5 Conclusion

Through the above-mentioned case, it can be concluded that teachers' changing concepts and updating teaching methods are the key to cultivating and inspiring students to learn mathematics. The key to the improvement of cognitive features of students who are tired of learning geometry is for teachers to leave the dominant power to themselves, subject power to the students, realize the emotional interaction between teachers and students. They should try to cultivate and inspire students' interest in mathematic. Raise students' interest for mathematics can not achieve obvious results overnight. It needs to persist in teaching for a long time, and teachers should constantly sum up experience in teaching and constantly learn from each other. Only in this way the expected results could be achieved.

# 6 References

Fangqu Xu, Wen Xu, “Transparent Geometry - New Practice of Internet + Planar Geometry”, Shanghai Education Publishing House, 2017