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THE OPINIONS OF PRIMARY SCHOOL TEACHERS ABOUT AROUSING MATHEMATICAL CURIOSITY IN STUDENTS

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ABSTRACT

In this study, it is aimed to introduce the term “mathematical curiosity” to the literature and to examine the views of classroom teachers in order to create and develop mathematical curiosity in students by starting from the concept of curiosity. For this purpose, the researcher conducted a semi-constructivist interview with 15 class teachers who were randomly selected using the phenomenological method, one of the qualitative research patterns. The classroom teachers were asked 5 questions about how they handle mathematics in general and what effect mathematical curiosity can have on the students. It is concluded in the study that it is a rather demanding but necessary task to draw the students' curiosity, interest and attention on the subject while teaching mathematics, which is abstract. Therefore, it is considered necessary for ”mathematical curiosity" to be handled within the education system and improved through studies on it by both teachers and researchers. Parents can be interviewed about curiosity and how to increase the mathematical curiosity of their children and various practices can be made accordingly.

Keywords: Mathematical curiosity, curiosity, mathematics teaching, classroom teacher.

INTRODUCTION

By what motive has human managed to not only establish the world of today but also carry it one step further? Which emotion of ours has opened the door to innovations since the primitive man? The sense of curiosity in people from birth to death has been the most important tool in creating 'today'. According to Maria Montessori, children show various sensitivities throughout their development after birth such as speaking, researching the environment and intense interest in objects around which are excessive learning aspirations that are necessary for the acquisition of skills. These sensitivities become effective thanks to the harmony between development impulses and the environment (Soydan, 2013: 271). In general, curiosity can be defined as the desire to see, know, feel or experience that motivates the search for new knowledge just like other vital needs (Litman, 2005). People and especially children learn what they wonder and are interested in easier and sooner. According to Bruner, encouraging the desire to learn in children triggers motivation. While external motivation is effective in repeating certain actions, intrinsic motivation provides continuity in learning. Curiosity is the most effective factor in intrinsic motivation. People are born with a sense of curiosity and slowly begin to get to know the world, starting with their surroundings. The curiosity of young children who try to solve the problems they encounter in daily life with curiosity increases with every problem they can solve and every success they have experienced.

Mathematics curricula, which have started to aim at a student-centred instruction with the constructivist approach, have enlightened teachers to motivate children to find solutions to their problems in mathematics and social life by motivating them in every respect and letting them experience the sense of curiosity. In the Mathematics Teaching Program, mathematical competencies defined as the development and application of mathematical thinking style to solve a number of problems encountered in daily life. Process, activity and knowledge built on a solid arithmetic skill are emphasized. Mathematical competence includes the ability and willingness to use mathematical modes of thinking (logical and spatial thinking) and presentation (formulas, models, constructs, graphs and tables) to varying degrees (MEB, 2018: 6). In fact, the foundations of the desire mentioned here are based on sense of curiosity.

Problem solving mathematics is an important component of learning and this issue continues to attract considerable attention for school mathematics recommendations (NTCM, 2000). The social, cultural and economic benefits of mathematics education at primary, secondary and other levels are innumerable. For this reason, it is very important for any child to learn mathematics deeply since childhood and reduce it to daily life. If compared with a triangle, the three corners of problem solving are undoubtedly comprised of the student-teacher-teaching program. During the teaching process, the teacher guides the students and sheds light on the concepts and problem solutions to be created by the students. After all; students construct their own concepts and problem solutions (Hacisalihoglu et al., 2004: 19). In educational psychology, the sense of curiosity, which is defined as a psychological condition that includes concentration, increased cognitive functions, continuity and emotional attachment, enables children to focus on a specific activity they have started and become motivated, thus directing their aimless activities and turning their aimless curiosity into a conscious search for knowledge in

Montessori classes (Soydan 2013). When constructivist teaching is carried out, teachers should enjoy research and discovery, have their students experience the same excitement, be able to respond to the students' small but very meaningful research and discoveries and encourage their senses of curiosity.

Our world is founded and developed on mathematics so we need mathematics in order to perceive and analyse events and facts more clearly. With the help of mathematics, we not only learn our past but also live our present time and plan our future. Contrary to the popular belief, the basics of mathematics that we try to teach our children as of pre-school period are not just numbers. In fact, the most basic structure that we have created, and have to create, for them is the sense of curiosity. As children begin to become curious from an early age, they will be able to go deeper into the problems and reach the numbers, which are the cornerstones of mathematics, there and then manage to count. The process in solving a problem in mathematics is very important. The student first understands the problem, then analyses and checks the data, and tries to find a solution. Mathematical curiosity plays an important role in producing and analysing problems that arise after a solution is decided and in developing experiences that most students do not have. In general, the word curiosity is defined as 'desire to learn'.

In this case, it would not be wrong to define the main point of our study 'mathematical curiosity' as 'the desire to learn mathematics'. However, mathematical curiosity involves not only the desire to know but also the desire to discover the ideals of mathematics. A mathematical problem itself and its solution lie within its capability of paving the way for future discoveries (Knuth, 2002: 126). Mathematical curiosity problems improves children's problem solving skills and supports their attempts to search for and find the facts. Sometimes, children can access the facts in different ways from adults (Rayahu et al., 2019: 1). Children begin to get bored with the monotonous narrator-listener technique in mathematics teaching after a while and learning becomes ineffective. However, curiosity, or mathematical curiosity that we emphasize, is an attitude that students always perform by asking questions and that requires research after obtaining information. What needs to be underlined here is that new discoveries are based only on the foundations of the curiosity and desire of the discoverer. Teachers play a very important role in developing and directing this curiosity. Teachers can create a new problem to shape the problem creation and analysis process. In this way, the student can be directed to new gates during the analysis phase, experience the process one-to-one and enjoy the solving the problem.

In recent years, students', teachers' and parents' curiosity, interest, anxiety and perceptions of mathematics have been investigated (Öztop and Toptaş, 2019; Rayahu, 2019) and it has been questioned what type of studies should be conducted to decrease the anxiety and increase the interest. This study is based on the analysis and discussion of classroom teachers' opinions about the universal concept 'mathematical curiosity'.

METHOD

Research Pattern

Qualitative studies are conducted to thoroughly investigate the meaning of an experienced phenomenon for individuals (Langdridge, 2007). In this study, the opinions of 15 classroom teachers about mathematical curiosity were taken and discussed. For this reason, considering its being appropriate to the purpose and the research questions of the study, phenomenological research method was used in this study. Phenomenological research aims to reveal our experiences and the meaning we have attributed to these experiences in our own world by focusing on the phenomena that we are aware of in daily life but which we do not have in-depth and detailed understanding (Yılmaz & Şahin, 2016: 148).

The researcher conducted semi-structured interviews with classroom teachers in line with the sub-problems of the study. The interviews were recorded with the permission of the participants. The sub-problems of the research are as follows:

• How do primary school teachers teach students so that they can arouse mathematical curiosity in students' minds?
• What kind of materials do primary school teachers design to arouse mathematical curiosity in students?
• What teaching methods and techniques do primary school teachers use to arouse mathematical curiosity in students?

Working Grup

The study was conducted with 15 volunteer serving in the provinces of central anatolia classroom teachers who were selected randomly based on the accessibility of the classroom teachers.

Table 1. Information about the Teachers Interviewed

Code Name	1*	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gender	M	M	M	M	M	F	F	F	F	F	F	F	M	F	F
Educational Attainment	F**	F	F	F	F	F	F	F	F	F	F	F	F	F	F

*1: Teacher 1 / ** F: Bachelor's Degree

Data Collection Tools

A semi-structured interview form was used to collect data in the study. The questions in the interview form were first prepared by the expert and then they were evaluated under thematic topics. A total of five questions on

which the two expert stated positive opinion were included in the interview form. The questions in the interview form are as follows:

1. How do you teach mathematics in general?
2. In your opinion, how does calling the students' curiosity and attention to the subject before the teaching process affect students? Please provide your feedback.
3. What kind of preliminary preparations do you take to attract your students' attention while you are teaching mathematics?
4. What kind of material do you design before teaching to arouse students' mathematical curiosity?
5. As a teacher, what do you think about creating mathematical curiosity in students?

Data Analysis

In the phenomenological research, it is aimed to reach the experiences of the participants. In this study, the researcher recorded the opinions of the classroom teachers who were interviewed through voice recording and writing and analyzed them through the process consisting of four steps. The four steps followed during the analysis are; 'parenthesizing' (the researcher suspends all his/her knowledge, thoughts, attitudes, values and prejudices about the phenomenon being studied during the analysis), 'phenomenological reduction' (identifying the basic characteristics or semantic units of experience in the interview texts), 'imaginary variation' '(revealing the structural themes of the phenomenon from the units of meaning) and 'synthesis of meanings and essences' (Giorgi, 2009). The researcher gave sample opinions obtained from the participants in the 'Findings' section.

FINDINGS (RESULTS)

In this section, the data based on the opinions of classroom teachers about mathematics teaching and mathematical curiosity are interpreted statistically and some examples of teachers' opinions are given. In other words, sample opinions of classroom teachers were given and interpreted under the headings each of which refers to an interview question.

General Course of Mathematics

As a result of the data analysis conducted within the scope of the research, classroom teachers responded to the question 'How do you teach mathematics in general?' stating that they do attention-grabbing activities, use materials when necessary and make an attention-grabbing and intriguing start on the lesson. As a result of the analysis, the course of the mathematics teaching was grouped under 3 headings in general.

Practice and Activities

Eight participants stated that they do student-centred and teacher-guided practices and activities in mathematics classes so that they could concretise the subject concrete for the students. The teachers stated that the most

helpful thing for their students who had to face an abstract learning from the moment they encountered mathematics was their own experiences, and therefore they were trying prepare activities and practices on almost every subject. Teachers who prepared activities and practices according to the school environment and the age level of the students asserted that the economic and social conditions of the school were much affected from this situation.

Teacher 5 has clearly expressed that the practices and activities organized for the concretization of teaching depend on the economic, cultural and social environment of the school stating:

> *"In general terms, I apply a student-centred approach and teach Maths by making associations to our school environment. For example; when teaching how to enumerate forward, I take the students out of the school and have them count the sheep in the village. Thus, I have the opportunity to teach my students, whose abstract learning hasn't occurred yet, the numbers by making concretizing them. The student learns by doing and experiencing, which makes the subject more permanent. When I teach children the numbers at the village school, they will freeze and look at me wonderingly if I tell them to take cashew with them instead of beans."*

Asking Questions before the Course

Three participants stated that they design the lesson based on questions that will attract the attention of the class before the teaching process starts. In addition, they claimed that these critical questions measure the readiness levels of the class, arouse curiosity in the students and draw their attention to the subject to be taught. In this way, the teachers who stated that they realized the shortcomings of the students in this way added that they could regulate the flow of teaching accordingly. Teacher 12 has views emphasized the importance of attracting students' attention before teaching with the following statements:

> *"I take into account the needs of students in mathematics while teaching Maths. I identify the deficiencies of the student in past subjects at the beginning of the term and check if there is a lack of information as the subjects pass in the following processes. This is an important point. I want to emphasize in particular. In the event that students develop fear or reluctance towards a subject in mathematics, they cannot explain their conditions and try to keep themselves in the background. For this reason, I pay attention to teaching Maths with different techniques. "*

Lectures and Internet-Supplemented Lesson

Four participants stated that they first informed the students about the subject and then tried to teach it with direct instruction method with the help of projection or online supplementary resources because of both the limited opportunities and the economic or social conditions of their schools. In general, the teachers stated that they used educational platforms on the internet while teaching and that they attracted children's attention and

curiosity with cartoons, animations and songs. The Teacher-3 explained how he benefited from internet platforms:

> *"First of all, I keep my students informed. I clarify its relation with the other subjects we have studies, I have them watch relevant videos from an internet platform. In the videos, I stop where necessary and I make explanatory and complementary explanations. If I think it's necessary, I explain the subject on the board until everyone understands it. Then we do the activities and subject tests on the internet platform together. Finally, I hand out the papers on which learning outcomes are written. I give them time to do the tests and we answer the tests together on the board when they have finished the tests."*

Teacher-7, on the other hand, mentioned the importance of animation and cartoons in children's learning as follows:

> *"I first make a story of the anime characters that the students watch and speak the same language with them. In this way, they find something that appeals to them in the lesson, like it a lot and wonder where the next step will be connected."*

Taking Students' Curiosity and Attention to the Subject before the Teaching Starts and Its Impact on the Student

All the participants of the study mentioned the importance of attracting attention and arousing curiosity among students. They also stated that measuring the readiness levels of students was effective in directing their attention and curiosity. Stating that the focus on mathematics should be kept fresh, teachers underlined the importance of students' curiosity and attention in ensuring their concentration on the lesson and preventing them from being distracted. Several participants who claim that teaching process is also positive in classroom environments where curiosity about the subject was well aroused before teaching expressed their opinions with the following statements:

Teacher-8;

> *"I think curiosity is the most important thing in life. We're more willing to learn what we're wondering. If we arouse curiosity about the subject, the student becomes more willing to search and learn the subject."*

Teacher-9;

> *"In primary school, students don't listen to any lesson that does not attract their attention, they are not interested in and they don't believe they can manage. In other words, it is very important attract the student's curiosity and attention for education to take place."*

Teacher-1;

"It is really difficult to attract the attention of all students at the same time. However, as long as we can attract their attention, of course this also affects teaching positively. Because the child wonders, and by nature, people learn what they wonder and have a fancy for more quickly than others."

Teacher-14;

"It is very effective to arouse curiosity in students and attract their attention before the teaching starts. They follow their curiosity and focus on the subject, enabling a more permanent learning and making the students more willing to learn.

Preliminary Preparations to Attract Students' Attention While Teaching Mathematics

Most participants stated that they spend a lot of effort especially in the preliminary preparation of mathematics course. In addition, teachers claimed that mathematics was taught better with activities that require preliminary preparation such as material design and drama, adding that children were more easily attracted to the subject in this way. Teachers who argue that speaking in children's language is one of the best ways to do an abstract lesson like Mathematics asserted that the language they understand is through fairy tales, stories, cartoons or animation characters that they are familiar with or curious about. Some of the teachers interviewed stated their preliminary preparations as follows:

Teacher-2;

"I start the lesson with stories, fairy tales, daily life problems, concerts, videos or presentations and continue the course with the material prepared for the course. Also, at the end of each lesson, I prepare a trigger question for the other lesson, which will serve to keep the curiosities and desires to learn alive. "

Teacher-15;

"Preparing material is very effective. Especially in village schools, because the children are far from everything, even a very simple material prepared by their teachers makes them happy and attracts their attention."

Teacher-4;

"Attending the class with materials or other inventories, telling what we are doing for what reason and informing the students about the objectives increase both the motivation of students and their curiosity."

Teachers who increase their students' motivation with appropriate games and materials to their ages stated that this was the best way to attract their interest in the subject.

Materials Prepared Before Teaching to Arouse Students' Mathematical Curiosity

Teachers answered the question "What kind of material do you design before teaching to arouse students' mathematical curiosity?" in two different ways. While the teachers in the first group stated that preparing the materials by themselves or with their students resulted in better results, other teachers stated that they preferred to use ready materials or did not use any materials at all.

Teachers Who Prepare Material Together by Themselves or with Students

Nine participants stated that either they prepared materials before the lesson or they prepared the material together with the students in the classroom environment if they had enough time to teach the subject in class. In addition, they asserted that the material preparation process led to difficulty in timing in terms of doing the courses and covering all learning outcomes. The following statements of Teacher-10 summarizes his opinions on covering the learning outcomes and designing materials:

> *"I would like to have material support especially when passing on to a new topic. Indeed, our lessons are more efficient and the subjects are learned more permanently when there are materials we prepare in class with my students. However, the material preparation task in the classroom is sometimes very hard and we waste at least 2 course hours. So either I'm trying to prepare materials at home and bring them to the classroom or I'm thinking of easier material design that can be prepared in the classroom. I love to lecture with material designs, but I am also aware that I don't have the luxury of missing the curriculum and the learning outcomes."*

Some of the teachers preparing materials at home or in the classroom gave examples of the materials they prepared and expressed their views as follows:

Teacher-8;

> *"We designed a character called Ritminço for rhythmic counting. We cut and glued it, and we made it talk. Since it is a product that the students have created and talked about, it also enabled them to make a review of the subject."*

Teacher-11;

> *"For example, when we were doing substraction with decimals, we used pencils to create decimals, and then we tried to do the same using other things around us. When students create materials with examples from daily life, they are more interested in the subject and eager to learn. "*

Teacher-14;

> *"For this, I try to concretize the subject bringing materials that they always use and know in daily life such as rope and beads or sometimes cake slices to the class in accordance with the subject to be taught."*

Teachers Who Use Ready Materials or Almost Never Use Any Materials

Examples of ready-to-use materials mentioned herein are mathematically designed materials such as decimal base blocks, geometry board, etc. Teachers stated that the materials they call math toys, which are bought with the teachers' own budgets or with the money collected in the classroom, were useful for concretizing the subject. The opinions of Teacher-6 on the issue is as follows:

> *"Sometimes, I really have difficulty in completing the subjects in time. But I am also aware of the benefits of using material to teach children what is told and to keep children's curiosity and attention alive in mathematics teaching. So sometimes I try to get ready-to-use materials. I can say that I benefit greatly from mathematical tools. "*

Two of the participants expressed that they did not use any materials at all because of both their concerns about completing the curricula in time and their incompetence in preparing materials.

Teachers' Opinions about Arousing Mathematical Curiosity in Students

Most participants stated that curiosity had an important role in increasing the interest of the students by actively living, having fun and learning permanently. In addition, they also emphasized the significance of student-centred education claiming that knowing a student well made a positive contribution in directing their curiosity and interest. In addition, 3 of the teachers stated that there would be no interest and curiosity stimuli towards mathematics at the same rate for each student but this situation could be turned into a positive direction within the scope of teaching. Some of the teachers' views about creating mathematical curiosity on students are as follows:

Teacher-13;

> *"Teaching mathematics is more demanding than other lessons. Of course, it is necessary to draw their attention and curiosity while enabling students to transfer abstract concepts to daily life. It's the first time I've heard of a concept of mathematical curiosity, but I think it's really necessary for elementary school children who are intrinsically curious to move this issue into mathematics. Children are always curious; so long as they can find the opportunity to direct their curiosity and learning desire properly. "*

Teacher-11;

> *"As a teacher, I'm trying to arouse mathematical curiosity in my student. However; due to individual differences, mathematical curiosity of each students differs from those of the others. Curiosity is high in students with high mathematical-logical intelligence. However, I think that children who do not have curiosity or are not aware of curiosity can be provided with mathematical curiosity by using different methods. Using materials will be helpful in linking the child's daily life with mathematics and reinforcing their success."*

Teacher-5;

> *"I would like to point out the fact that learning always starts with curiosity and such learning will always be permanent in the mind of the student. The important thing is not only to give abstract figures, but also to teach them concretely with curiosity in them. I think that arousing curiosity as an important factor in learning according to the conditions of the student and the school, organizing the existing opportunities and preparing materials always motivate students and contribute to their success."*

Primary school teachers, who stated that they could start and direct play-age children's interest and learning desire with curiosity, also considered curiosity as the main element for mathematics teaching.

CONCLUSION and DISCUSSION

The Latin word for curiosity actually means attentive and studious. Curiosity, which is an impulse that exists in humans and many animals and that seeks answers to questions for the sake of discovery, investigation and learning, has been the subject of many studies. From the moment they are born, humans want to get to know and define those around them. According to Piaget (1952), the ages between 4 and 7 are those during which children feel curiosity and ask questions the most. Litman (2005) states that our main aim in curiosity is to provide a healthy psychological and socio-atmosphere environment in which the child can think safely and freely to explore and manipulate his environment. Therefore, as the most important person who can provide this healthy environment for the children in primary school, classroom teachers have great responsibility. One of the results obtained from the interviews with classroom teachers in this study is that children learn the things they wonder more easily and permanently. For this reason, the subject to be taught must certainly raise the children's appetite and arouse the desire to learn. Teachers make their preparations and plans before the class just to attract students' interest.

The similarity of the questions asked in the scope of the research can be explained by the purpose of the researcher to determine how the class teachers do mathematics lessons in general and how important curiosity is in teaching mathematics. Therefore, the first question asked to the participants was how they did mathematics

lesson in general. Most of the teachers stated that they prepare their lessons by preparing materials or activities where necessary. Teachers who stated that the most practical way of concretizing abstract concepts on students was through materials while teaching also emphasized that designing materials in the classroom or at home had positive effects such as creativity and fun learning. Kılıç et al. (2013) prepared various activities and activity sheets in a classroom with low socio-economic level in parallel with the curriculum and examined the effect of students on learning with materials and activities. As a result of their studies, researchers found that teaching with materials increased mathematics achievement in general. In another study conducted by Gökmen et al. (2015), it was found that teachers had high proficiency beliefs about using materials. However, according to their findings, the researchers also stated that there was no significant relationship between teachers' level of material use and their proficiency beliefs.

The result of the study by Gökmen et al. (2015) revealed that teachers did not use materials, which actually coincides with the result of the present study. Another mathematics course obtained from the interviews received from teachers is the process of lectures which are supported by internet and in plain expression without using any material.

The second question posed to the teachers was about the effects of attracting interest and curiosity among the students before teaching. Teachers' answers are quite close to each other. Teachers who stated that children learn the subjects they are interested in and curious about more easily and permanently also emphasized the importance of drawing students' attention to the subject beforehand whether applied or direct instruction technique is to be used in the lesson. In addition, teachers stated that they could not only measure their students' readiness levels but also direct the course of the lesson with such intriguing and attention-grabbing questions and practices. Bloom (1995) claims that measurement of readiness in students plays an important role in the teaching and learning process and directly affects the learning-teaching system. Yenilmez and Kakmaci (2008) aimed to measure the level of readiness of the students they chose on a sample basis and found that the readiness level of mathematics students differed according to their mathematics achievement, interest in mathematics and their belief that they would be successful in mathematics. As a result, the determination of the readiness levels of the students gives important clues to the teachers about the direction of the course flow and how to achieve success.

Preliminary preparation that can be considered together with the plan and discipline, two cornerstones of an effective education process, is actually one of the most important requirements that teachers can add to the teaching process. Another question posed to the teachers was about what kind of preliminary preparations were made before the lesson to draw their attention to the subject. In general, teachers who asserted that they could not get enough efficiency from the course and the teaching they had done without preliminary preparation stated that they preferred to be planned and prepared not only for mathematics but before all their courses. At this point, the fact that the participants are generally in their first years in the profession (maximum 5 years) may be what makes them more willing to teach and prepare for teaching. Undoubtedly, while teachers who are new

in their professions do their job more enthusiastically, the first thing they think is about how their teaching will affect their students. On the other hand, teachers who have spent ten or more years in the profession are found to prepare and use fewer materials. In other words, the rate of preliminary preparation decreases in direct proportion to seniority in profession. This may arise from the fact that such teachers have achieved professional satisfaction and think that they have put their jobs in a routine. Cemaloğlu and Şahin (2007) aimed to determine according to what kind of variables the burnout levels of teachers differ. One of the findings of the researchers is that senior teachers' depersonalization and emotional exhaustion levels are high,

The teachers who were asked to list their preliminary preparations generally listed them as preparing activities, designing materials, preparing interesting questions for the introduction and designing story or drama related to the subject. In addition, the teachers added that although it required a painstaking preparation beforehand, drama was found more effective in students' learning by experience. The need for painstaking preparation process may also explain the result of the study by Karakaya (2007). Karakaya (2007) in his study aimed to learn the effects of drama on the learning and development of primary school children. Within the scope of this aim, one of the results of the research in which applied drama was performed with the students is that teaching with drama is very useful but teachers prefer it very little.

When asked what kind of material they designed to attract mathematical curiosity and effective teaching, many teachers mentioned creative materials. Teachers emphasized that it is only through concrete means that elementary school children can be introduced into a world full of abstract concepts such as mathematics. Similarly, Kutluca and Akın (2013) found that the use of materials in mathematics teaching provided students with analytical thinking and social interaction skills.

The purpose of the last question posed to the teachers was to get their views on mathematical curiosity. The teachers stated that the primary school period, in which curiosity is experienced most, should be spent with activities and practices aimed at arousing curiosity, drawing attention and directing desires. Especially when it comes to Mathematics lesson, in which children can learn by questioning and researching, curiosity should be triggered more. Children wonder, want to know what they wonder and love what they learn.

Learning mathematics is based on children's curiosity and develops through natural experiences. Knuth (2002) began to investigate how teachers could start creating classroom environments that encourage and improve mathematical curiosity of their students. With the studies seeking other ways in which students can solve mathematical problems, it was found that arousing a desire to learn in students' minds also increased their curiosity (Knuth and Peterson, 2003: 574-576).

Curiosity and discovery, which are the neurobiological characteristic of people, direct the games and problems solved. As children explore the environment, they can be satisfied with the curiosity of play, thus expanding the catalog of experiences. Children discover when they investigate. A good learning cycle is guided by the pleasure

taken from the game. Curiosity brings about the pleasure and that pleasure gives rise to the desire to learn and repetition. Perry et al. (2000) stated that at the end of this cycle, the desire to learn would lead the child to curiosity, starting the same circle again. In addition, they also asserted that the learning cycle which starts with curiosity and continues with the pleasure taken from the game would accelerate and facilitate emotional, social, motor skills and cognitive learning (Perry et al., 2000: 9). In this sense, curiosity is an essential element of easy and permanent learning, which is one of the most targeted in mathematics teaching. The best and most effective way to instill the feelings and desires of research, discovery, tasting and feeling in our children is to arouse curiosity in their minds. Therefore, we, as educators, should not forget that what we need to teach our children, who have been discovering everything with their eyes from the moment they were born, is to encourage them to be curious and do research starting from the tip of their tiny noses to kilometres away. It is at this point that mathematics and the passion for mathematics will feed the children's desire for knowledge and learning, and help them proceed on their ways by getting the taste of success with the right orientation of their teachers.

RECOMMENDATIONS

In this section, recommendations that are hoped to be useful for future research are presented in the light of the findings obtained within the scope of the research.

- Studies on the concept of mathematical curiosity should be increased and contributions can be made to the literature by making further interviews with the classroom teachers to serve the purpose of directing the students' interest and curiosity towards mathematics lesson.
- Studies can be carried out in order to enable students to approach mathematics positively by taking into consideration the internationally published studies that may reduce the anxiety and reluctance of students towards mathematics.
- Parents can be interviewed about curiosity and how to increase the mathematical curiosity of their children and various practices can be made accordingly.

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