Analysis of Students' Perceptions of Mathematics Subjects: Case studies in Elementary Schools

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Abstract. The main problem is elementary school students who have negative perceptions of mathematics. The purpose of this study was to analyze the causes of the emergence of negative perceptions and positive perceptions of students towards mathematics subjects. This type of research is a qualitative study with research subjects of elementary school students. The instrument used was an interview. Data analysis used three steps namely: reduction, data presentation, data verification. The results of this study noted that students who have a positive perception of mathematics are caused by two main factors, namely teacher factors related to competence and internal factors of students in the form of interest or motivation. Students like mathematics because they feel the subject matter will be useful for themselves to be used in everyday life. The results of this study are very important as information and input for educational providers in elementary schools, especially for mathematics teachers who directly interact with students in the learning process.

1. Introduction

Students at the elementary school level are individuals who are still experiencing a process of development at a concrete operational stage, because at this level students will be implanted with the first experience of a particular subject so as to emerge likes, happiness, phobias, difficulties, or dislikes at all even hate. The big hope is that students will like all subjects from elementary school to master and understand the concepts of all material well from an early age so that it will make it easier to understand the next concepts at the next level. The learning process in elementary schools will greatly affect the formation of student knowledge. According to Gurganus, previous student experience on certain subjects is a strong predictor of future success [1].

The results of Evi Fitriana's research, Sugeng Utaya & Budijanto stated that there were still students who had low and very low perceptions regarding the learning process implemented by the teacher [2]. Similar research results state that the percentage of students' perceptions of the learning process is only in the sufficient category and there are no positive perceptions of students found in the good and very good categories [3]. The results of Nani Restati's research reveals that students' perceptions of mathematics are different, 45% of students consider mathematics difficult, 80% of students consider mathematics as an important subject and 85% of students state that learning
mathematics through games becomes fun [4]. Another problem is students who have negative perceptions of arithmetic subjects and have low learning interest [5]. The Intisari’s research results states that students have a negative perception of mathematics and consider mathematics as a subject that is difficult, frightening and makes them stressful [6]. The various research results above indicate that each student in the class has a different perception of the learning delivered by the teacher, such as mathematics learning.

Of the various problems found in previous studies, it is not much different from the problems found in this study, such as students' different perceptions about mathematics, students' various interest in learning mathematics, nonoptimal learning outcomes and the low ability of most students to absorb the material. These findings encourage researchers to find out about students' perceptions of mathematics as well as what are the factors that influence it. The results of this study can later be used as information for schools, parents, especially teachers who teach mathematics in order to know what causes students to have negative perceptions of certain subjects so that solutions can be found. It is also as the first step for teachers in determining strategies that can be developed in improving the quality of learning mathematics in elementary schools. Until recently, there has been lack of research on this matter, even though it is very important to find out the root of the problem of why individuals do not like mathematics.

Conducting a search of students' perceptions in elementary school regarding mathematics, is an important factor, because the ability to understand mathematical material in elementary school determines performance at the next secondary school. It is in line to the research conducted by Ani Restati Siregar on Search regarding students' perceptions of mathematics. Ani Restati Siregar also said that her research is the basis for providing interventions and information for researchers through research and for teachers as a reference in choosing learning strategies and methods, so that students feel happy and they don't hate it [7]. Other experts have done a lot of research on the influence of psychological factors related to student performance on mathematics subjects, including the concept of self-effect on mathematics achievement [8], students' perceptions of teacher behavior and motivation that affect self-efficacy and intrinsic motivation of students [9]. The results of Mensh's research; Okyere & Kuranchie stated that the teacher's positive attitude towards mathematics influenced the formation of students' positive attitudes on mathematics as well [10].

Perception is one aspect of psychology that is important for humans in responding to the presence of various aspects and symptoms around them. Perception contains a very broad understanding, concerning internal and external. Experts have provided various definitions of perception, although in essence they contain the same meaning. Pareek believes that perception is a process of receiving, selecting, organizing, interpreting, testing and reacting to stimuli obtained through the five senses or data [11]. Hendra Mashuri states that perception is a presumption from someone about their environment that is obtained through sensory impairment [12]. According to the Big Indonesian Dictionary, perception is a direct response (acceptance) of something. The process of someone knowing several things through the five senses [13]. According to Agestina, perception has three dimensions, namely: 1) Knowledge, 2) Expectation, and 3) Evaluation, is an individual's conclusion about someone, based on how someone (according to individual knowledge about someone) fulfills individual expectations about someone [14]. Each student's perception of the teacher is not always the same. This is because the characters, ways of thinking, family backgrounds, and past experiences of students are different.

2. Method

This type of research is qualitative research that aimed to investigate a social phenomenon and human problems. The instrument used to collect data was interview instruments. The subjects of the study were students of Public Elementry School 2 Teke in grades four, five and six with a total of 45 students. To analyze the results of the interview data, qualitative analysis was used, according to Miles and Huberman that qualitative analysis was carried out through three stages, namely: 1) Reduction, 2) Presentation of data, and 3) Verification of data. The validity of the data was tested by using triangulation techniques. Triangulation used was triangulation of data collection methods [15].
After conducting in-depth interviews with respondents, the data were grouped into two parts, namely groups of students who had positive perceptions and groups who had negative perceptions of mathematics. The following are the reasons given by students.

| Table 1. Liked and disliked subjects and students’ perceptions |
| No | Students’ perception | Subjects | Students’ description |
|----|----------------------|---------|----------------------|
| 1  | Positive perception | Mathematics | a) Math is useful for daily life, b) The answer is certain, c) Counting is fun (intrinsic motivation), d) The student was taught by a pleasant teacher |
| 2  | Negative perception | Mathematics | 1) The teacher forced students to do tasks on the board in front of the class, 2) The material taught was difficult to understand, 3) The teacher was always serious, 4) The lesson was monotonous because of taking notes in every meeting, 5) Materials given were stressful for students, 6) there is no repetition in learning Mathematics. |

The table above shows that students who have a positive perception of mathematics with a percentage of 33% while students who have a negative perception of mathematics with a percentage of 67%. This perception arises for a variety of reasons expressed by students. The results of subsequent interviews related to students' desires in the process of learning mathematics. There are several recommendations made by students as follows: 1) Learning through play and not too serious; 2) Not monotonous by taking notes continuously; 3) Does not force to do tasks in front of the class; 4) The material must be related to daily life (contextual); 5) There are variations in teacher teaching; 7) There is attention and gift.

3. Discussion

Based on interviews with students of Elementary School 2 Teke, information was obtained that there were many reasons why students disliked and avoided mathematics. The results showed that 33% of students liked mathematics and had a positive perception, while 67% of students had a negative perception of mathematics. From the results of the qualitative analysis of the data, it can be seen that there are two main factors that influence the positive and negative perceptions of students towards mathematics learning, namely the teacher factor and the factors within the students themselves such as intrinsic motivation. The teacher is the main factor that greatly influences the success of the learning process.

From the results of the interview above, students do not like math subjects with the most reason is the factor of teachers. It is consisted of teachers who teach monotonously without any variation, the teacher who asks to take notes continuously, the teacher tells students to memorize, the teacher is too serious, the teacher do not use teaching through play method and there is no attention and gift. According to Cvencek, D., Kapur, M, & Meltzof, A.N. (2015), there are main factors that can influence the learning process in the classroom, namely the teacher factor. These factors include teacher education background, teaching experience and the use of media and methods. Teachers with the right educational background will greatly affect their competence in teaching [8]. Teachers who teach in elementary schools are certainly teachers with a background in primary teacher Education undergraduate major. They have been equipped with various knowledge and competencies that will be applied in the field during the study period, especially those related to eight teaching abilities, the psychology of children's learning and the preparation of learning tools and the use of methods, appropriate media in learning. Armed with a variety of knowledge, teachers are expected to be able to teach well, be fun for students and not be boring and the main thing is that students quickly absorb the material being taught. In addition to educational background factors, teaching experience also plays a
role in carrying out learning that is fun for students. Teachers can learn from a variety of experiences so that they continue to make improvements that can improve the quality of learning. According to Syaiful Sagala, teachers are a very important factor in implementing education in schools. Therefore, the quality of teachers needs to be improved both in terms of welfare and professionalism [16]. Teachers as professionals are required to have teacher competencies with the aim that teachers are creative and skilled. According to Lisa Wahyuni, skilled teachers will be able to arouse students' enthusiasm in learning [17]. Creative teachers will be able to choose and use a variety of models, methods, and learning approaches and use appropriate learning media to attract students' attention and improve learning achievement. The results showed that there was an influence between the teaching creativity of the teacher on the absorption of students towards the material being taught [18].

According to Wardana, teachers who use appropriate teaching methods in accordance with the material and circumstances of students will make learning effective and enjoyable [19]. Effiyati Prihatinin’s research results indicate that there is a significant influence between the learning methods used by teachers in learning on student learning outcomes [20]. Furthermore, according to Diyah Ayu Triumiana & Sumadi, one of the factors of student success in learning is the teacher's teaching style factor [21]. If the teacher's style of teaching attracts the attention of students, it will lead to positive perceptions in students of the material being taught. The results of his research show that there is a positive relationship between the teaching style of the teacher and student learning outcomes. According to Wulandari, students who succeed in learning are influenced by the teaching style of the teacher [22].

Teaching through play is expected to be applied in the learning process in elementary schools. Based on the interview results, it was obtained information that students do not like math subjects because the teacher does not apply learning through play methods. According to Damasita (Anggraini Dhi an K. 2016), judging from its characteristics, elementary school age students have habits and characteristics that like to play, move, work in groups, and like to feel or actively do something directly [23]. According to Vandercruyssse, et. al. that learning implemented by applying games can affect aspects of student motivation in learning and lead to positive perceptions [24]. In addition to teaching through play, it is strongly recommended that learning is also carried out with the help of instructional media such as showing interesting pictures and there are animations, because elementary school-age students are very interested in learning that is completed with interesting media. There have been many research results that prove this, such as the results of Mahmoudi's research; Kaushafar; Saribaglo & Pashavi, 2015 [25]; Michels; O’Gorman & Kucian, 2017 [26]; Shaftel; Pass & Schnabel, 2005 [27]; Ahmadi, Suharti and Ulfiani Rhaman, 2017 [28]. The results of the study showed that the application of animations accompanied by sound and interesting images, made students interested and improved brain development.

According to Baek & Touati (2017), learning through play can make students more enjoy so that it implies student academic achievement. Even though mathematics is considered a difficult subject, but applying the method of teaching through play can change negative perceptions of students to be positive [29]. It has been proven in the results of the study (Riconscente, 2013) that mathematics learning taught in elementary school class V through math games can change students' negative perceptions into enjoyable learning [30]. The teacher's creativity in using various methods, media and variety of learning will motivate students. According to Muhamad Ali, the use of teaching methods aimed to motivate students to learn and encourage students to be more active [31]. Monotonous teaching methods can make learning to be difficult for students. Koh's survey results; Kin; Wadhwa & Lim in 2011 found that games that are applied in learning can provide significant benefits [32]. Linda Darling Hammond and John Baratz Snowden suggested that teachers must be able to create an effective learning atmosphere so that students become enthusiastic to learn in the learning process [33]. In addition to teaching through play, students are also very interested in contextual learning. Students will be able to easily understand the material and easily connect the knowledge they have with the material being studied. According to Sugihartono (Anggraini Dhi an K. 2016), the learning process of students will run well if the subject matter to be studied is presented contextually so that it is continuous with the experiences students have from daily life [34]. Four research results state that enjoyable learning can shape positive perceptions and can improve students' abilities (Ke, F., 2008
Positive student perceptions also arise because of teacher activities that give attention and reward to students both during the learning process and outside class hours. Because of the attention given by the teacher, students feel appreciated and can encourage them to have interest and motivation to learn better. According to McCombs, et al (John.W. Santrock, 2007), teacher support and attention aimed at students can encourage students to do better academic activities [39].

The second factor that affects students’ perceptions of mathematics is students’ interest in learning and internal motivation. Students like the mathematics subject because they have a very big push from within themselves to learn without being influenced and encouraged from the outside (external). Therefore, many give reasons that they like mathematics because they think that the material they learn will be useful for use in everyday life and the material is directly related to life. In the opinion of Richard M. Ryan and Edward L. Deci, inner encouragement (intrinsic motivation) is a very important construction and reflects the natural tendency of students to learn and be assimilated [40]. The results of Setiawan’s research show that the encouragement from within students is very significantly influence the willingness and enthusiasm of student learning, so students will be serious and like any subject [41]. The research results of Wang et.al show that students who have low learning motivation from within themselves will cause anxiety and dislike the things they learn. Conversely, if students have a strong learning drive, it will affect the spirit of learning and they will like the subjects they learn [42].

4. Conclusion
It is known that the emergence of students' positive and negative perspectives on mathematics is caused by two main factors namely the teacher's factor and the interest/motivation factor within the student. The teacher factor is related to the way of teaching, which includes the use of methods, teaching aids, and the teacher's ability to relate the material to students' lives. Moreover, the factors also include class management such as paying special attention to students who have learning difficulties, not being monotonous to write material on the board, and not forcing students to do task in front of the class. The second factor is a factor within students in the form of motivation and interest. Students like mathematics because the subject matter taught by the teacher will be useful for themselves to be used in everyday life in the present and in the future.

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