ENVIRONMENTAL FACTORS THAT INFLUENCE STUDENTS' MOTIVATION IN LEARNING MATHEMATICS: A CASE STUDY

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Abstract- This study was conducted to determine the influence of environmental factors on students' interest in mathematics. The research design was a qualitative method which consisted of a structured interview, documents and reflection journals as research instruments in the study. The study participants were from pre-diploma and diploma students who took social and technological mathematics at A Vocational College. This research only focused on the factors influencing the learning environment. 15 students and seven teachers /lecturers were used as volunteer participants. The physical factors were chalk, board, arrangement of tables and chairs as well as classroom temperature. Other factors were teachers / lecturers and teaching and learning duration, peers and parents. Other relevant factors were classroom's physical environment, smell and cleanliness. Curriculum and internet line were also discussed. The respondents were selected using random sampling from different classes.

I. INTRODUCTION

There were few studies about the environmental factors that influenced students' motivation towards mathematics among vocational college students and this encouraged me to analyse teachers' reflections upon mathematics teaching and learning. The problems included time allocation for the entire Vocational College curriculum. Teachers who taught these mathematics subjects claimed that there was no enough time to teach the subject. Based on the reflection of seven teachers who taught mathematics, it was found that students' focus on mathematics was low. This has caused their achievements in mathematics to be less satisfactory than their vocational subjects.

The analysis of both the results of the examination for the 1st semester of 2015 and the semester 3 of 2014 indicated that mathematical subjects were among the less accomplished subjects than any other subjects. This target goal for vocational graduates were 70% of them would become skilled workers, 20% would continue their studies and 10% would become entrepreneurs. However, academic components in particular parts of the mathematics subject needs to be emphasized because maths is important for self-preparation to continue their studies and as entrepreneurs. In addition, Mathematics is the core of basic skills for them to be self-reliant as well as an essential basis for further higher-level education.

Mathematics is one of the important subjects in the education system in this country. However, there were many complaints from various quarters about the weak level of Mathematics proficiency among the majority of pupils in the country (Kamel Ariffin, 2002). According to Hashimah (2014), some of the common environmental factors for students' weak performance in mathematics were skills, lecturers, peers, classes and class temperatures.

Great interest in learning mathematical subjects often positively affected the results of learning the subject in exams Lecturer factors are the most influential factors in influencing students' academic achievement followed by friend factor and interest factor (Md. Johan, 2008)

2.0 Research Questions

This study was based on the qualitative approach. The research questions were as follows:

1. How did the teacher influence the interest of the students in mathematics?
2. How did the curriculum factor influence the interest of students in mathematics?
3. How did the physical factor influence the interest of students in mathematics?
4. How did the teacher's teaching factor influences student's interest in mathematics?

3.0 Literature Review

Previous studies showed that classroom environment did not seem to affect mathematics achievement once intrapersonal factors and alternative test performance were included in the model but it was associated with subject interest and academic self-concept. Perceptions on classroom environment may have an indirect influence on students' achievement by boosting their interest and self-concept. In turn, these intrapersonal factors had direct relationships with students' achievement and it was also found that it also infuenced the relationship between perceived classroom environment and mathematics performance. Findings and their implications for mathematics education were discussed (Tosto, Asbury, Mazzocco, Petrill, & Kovas, 2016).

Structural Equation Modelling. The results showed that the teacher' responses and students' attitude towards mathematics were the highest and lowest factors influencing the students' achievement respectively. Moreover, the relationship among

teaching practices and teachers' responses was high (0.68). Generally, positive correlations between these factors with student's achievement in mathematics were evident (Mohamed, Mustafa, Lazim, & Hamdan, 2012).

4.0 Methodology

This study utilized using qualitative methods. According to Noraini Idris (2010), all research involves data collection. Data refers to information obtained by researchers on the subject of research or study. Participants of the study (students) were randomly selected from various classes. This student consisted of various classes. Out of 15 students, 4 of them were students of excellent mathematics while 11 were moderate. While the study participants (teachers) consisted of 7 teachers who had been teaching more than 7 years. In implementing and conducting research on this instrument, the researcher used several methods as a research instrument among them:

i) Structured interviews for teachers

Structured or standardized interviews were conducted on teachers. The purpose was to get teachers' specific opinions. What is the factor that causes students to be interested in math? The answers given by the teacher would be more specific and thorough according to the class that they were teaching. The interview questions delved into the background of the participants and the method of teaching and learning used.

ii) Structured interviews for students

Structured or standardized interviews was also conducted on the students. The purpose was to get specific responses from the students. For example, what were the main reasons why you were interested in mathematics? The answer would also be more specific from the students' perspectives.

iii) Documents

Researchers have reviewed documents such as the semester exam results and documents from the previous semesters. The information was also obtained from the student's record book held by the class teacher. Through this student record book, researchers would be able to obtain information about the actual socioeconomic status of students or participants.

v) Teachers' Reflection Journal

The writing of this teacher reflection journal would be the basis of the problem statement. Teachers were asked to write a reflection journal that contained factors affecting students' interest in mathematical subjects. Some of the factors that needed to be discussed were physical factors, teaching and learning times, teacher workloads, teachers' preparations including teaching aids, students themselves and parental support.

vii) Report of the student examination results

Students 'academic decision-making reports from the previous semesters would report students' academic achievements and comparisons between academic achievement and students' skills.

viii) Observation.

In addition to interview methods, researchers also used observation methods in obtaining information and information resources. In order to obtain these information, the researcher observed the actions and behaviors performed by mathematicians and students. In this method, observation was done on the teaching process by teachers. Researchers recorded what the teacher did, whether it was the way the teachers taught, the question and answer session, as well as the exercises provided by these teachers to their students. Similar observation was made on the students too.

5.0 Findings

Based on this study, students' interest in the subject of mathematics was influenced by several factors. These factors were physical factors of the classroom, teaching and learning time, teachers, parents' encouragement, peer pressure and other reading materials including materials from the internet. Overall, the factors that helped to foster the interest of students were the physical environment that involved the use of whiteboards, cleanliness and stench, environmental noise, table and chair layout, class temperature, other amenities and class cheerfulness. For curriculum factors, participants were more concerned about time constraint and the inadequate syllabus. The other issues or themes which were discussed were teacher, peer pressure, parent's encouragement and mathematical learning materials such as reference books and internet facilities.

The findings showed that students 'interest in mathematics was caused by several factors which were physical factors, teaching and learning time, curriculum, teachers, peers and parents' encouragement. In addition, internet usage was also available to help students in addition to good reference books.

The physical factors that were discussed in the study participants were more on the use of blackboard in the classroom. Keningau vocational college still used whiteboard and chalk in most classrooms. Thus, the participants of the study suggested that the whiteboard and chalk should be replaced with white board and pen marker.

Classrooms that were not clean and smelled also distracted the students in the classroom. The data showed that 3 out of 15 students were disrupted by the cleanliness and scent of the toilet. One teacher who stated that the stench was disturbing the process of teaching and learning.

This noise came from the roads outside the school compound and radios in the classroom. A total of 3 out of 15 students were disturbed by the noise from the roads and radios. While no teacher has the same opinion as the participant.

Table layouts and chairs also influenced the teaching and learning process. The tables and chairs need to be neatly arranged and according to the learning style chosen by the teacher to make the learning environment of the mathematics more interesting. In addition, the number of tables and chairs should be sufficient. A total of 9 students said that the layout of the classroom was not conducive enough for them to learn. 2 teachers expressed similar opinions. Other physical factor was the class temperature. The non-functioning fans caused the classroom to be hot and majority of the students and teachers could not focus due to the heat. However, if the class had been decorated well, the students seemed to have a better attitude towards learning. Another common problem was the lack of classrooms in the schools which could affect the teaching and learning time as the teachers and students needed to find space that they could properly carry out the class.

The vocational college curriculum also contributed to the difficulties in learning mathematics. The students generally felt burdened by the heavy workload and hectic schedules especially when they needed to juggle vocational and academic subjects. Majority of the students had little preference in mathematics classes that were scheduled in the afternoon as they tended to feel sleepy and tired to focus in the class.

The results also showed that most students felt that the teachers displayed great skills and techniques in teaching them mathematics. The students also claimed that ther peers were very helpful in helping them understand certain parts of the subjects. Many stated that they received support and encouragement from their parents to learn mathematics and this had been a positive influence to them. They also cited how internet helped them learn better as they had access to unlimited amount of information.

This finding is consistent with findings by previous researchers. According to Hashimah (2014), the influence of the skills, lecturer, peer group, class and environment management plays an important part in students' interest in mathematics. The most dominant factor of the environment factor is the skill factor.

The physical environment of the classroom is an important element in shaping a conducive and encouraging learning environment. A conducive environment can help create the optimal context for teaching and learning to take place effectively while enabling students maintain their focus and interest in learning in the classroom. Learning space, furniture, airflow and lighting in the classroom have a moderate level of effects on students' learning. Hence, the physical environment of the classroom should be carefully and carefully planned because the appropriate physical classroom environment affects the learning environment, idea generation, values, attitudes and behavior of students (Che Nidzam & ect, 2013).

Noor Erma & Leong Kwan Eu (2014) notes that teacher's interest and teaching skils are important factors in determining student achievement in Additional Mathematics. Peer factors do not show great influence in student achievement. This may be because private secondary school students are more likely to be open-ended and study alone rather than studying with peers. Therefore, teachers' teaching approach is an important factor in encouraging students to strive for excellence performance in Additional Mathematics. In addition, the factors that need to be studied should be more comprehensive and are not only limited to attitudes, interests, teaching of teachers and peers. This is because learning process covers a variety of things whether at school or at home or while in a wider society. Assessment of a more comprehensive range of factors will give a wider and more accurate picture of students' achievement in Additional Mathematics.

CONCLUSION

Based on this study, teacher, students and administrators need to know that environmental factors such as the layout of table and chair in classroom, class temperature, basic amenities, noise, whiteboard, lighting, classroom position, teacher skills, teaching teacher attitude, time teaching and learning, teaching aids, peers, parents' encouragement and other physical needs such as reference books and internet access have significant impacts on students' interest in learning mathematics. Therefore, teachers or lecturers, students and administrators need to take the necessary and appropriate steps in order to make sure that mathematics teaching and learning become more fun and engaging for students.

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