

FACTORS INFLUENCING THE ATTITUDES OF SECONDARY SCHOOL STUDENTS TOWARDS THE STUDY OF MATHEMATICS.

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Abstract

It is a known fact that there exist behavioral difficulties among Mathematics students in Eswatini as a result of unresolved attitudinal issues that either the students are not aware of, or that the issues are not properly dealt with. This work seeks to investigate some factors influencing the attitude of secondary school students toward studying Mathematics in the Manzini region. Five schools consisting of two boys-only, two girls-only, and one mixed school were been carefully selected for the investigation. A total of 200 students and 15 qualified teachers were randomly and actively engaged. A combination of the discrete and continuous data collected through observations and using a well-designed questionnaire was carefully analyzed from their graphical representations. It was found that the majority of the students showed a huge gap in the content knowledge and also presented a clear negative attitude towards Mathematics as a subject. Some of the factors responsible for this worrying pattern, as shown by the analysis include poor background from their primary schools, ineffective teaching methods by their teachers, and lack of motivation by their parents among others. Training programs for teachers particularly on the use of technology and teaching aids to better disseminate the contents and the rewards were also highlighte

INTRODUCTION

Background of the Study

The right way to introduce young pupils to mathematics is not to teach Arithmetic, Algebra, Statistics, and Geometry as separate branches, each with its own technical apparatus and methods. The ideal thing is to treat mathematics as a science in which the topics are chosen so as to develop a grasp of mathematical ideas. Therefore, the early stage of mathematics teaching is very important since the pupils' future performance in the subject depends on how well he performs at this stage.

Despite all efforts towards scientific and technological development, it is observed that most students have a negative attitude toward mathematics. This attitude is reflected in their poor performance in school certificate mathematics examinations.

The purpose of the study is to investigate the attitude of secondary school students towards mathematics with a view to identifying the basic factors underlying them. attempts would also be made to find solutions to these problems.

The choice of this topic for research is based on the urgency of the need for a positive attitude towards the study of the subject. This need is based on the usefulness of this subject towards the scientific and technological development of the country.

The main concern of this investigation would be the effect of teachers on the student's attitude toward the study of mathematics, its relevance to the vocational aspiration of the students concerned, and the effect of low scores in mathematics examinations on student attitude.

This study is limited to only post junior secondary students in five selected secondary schools in Manzini.

In the administration of the questionnaire, the students and only qualified mathematics teachers in the secondary schools were interviewed.

Previous Works

Much of the work so far has been centered on investigations into problems of teaching mathematics in school. Some authorities have called the same, giving insight into what this problem focuses upon. So, this literature will be reviewed so long as they bear a resemblance and shed light on the study.

According to Fakuade (2004), an average child is capable of learning mathematics successfully up to the ordinary level of the General Certificate of Education. He observed that the performance in mathematics is well-run, well-staffed, and well-financed schools like Government colleges and schools and other isolated, well manage institutions are such that one would believe that the majority (80%) of students in such schools take kindly to mathematics. In other words, the intellectual ability of the students for mathematical learning is quite robust.

He quoted Piaget as "saying that early childhood (3-6 years) is the period during which children are capable of learning to achieve some essential and perhaps advanced concepts in elementary mathematics". This, under favorable conditions children who have the advantage of exposure to mathematics situations at home and in their surroundings can gain accelerated knowledge of mathematics, quite early before reaching school age.

Ademola (2006) found out the results of over 45 major studies carried out under school and university conditions indicate that mastery learning has effects on students' cognitive and affective development and their learning rate.

Mastery learning procedure can enable four-fifths of students to reach a level of achievement that less than one-fifth attain under conventional, uniform group-based instruction procedures. The additional time needed for this is 10% to 20% of the normal class time. He quoted Bloom as saying "The strategies seem to be especially effective for those students who typically have problems in that kind of learning task (subject matter).

Research is repeatedly demonstrating that individual differences in achievements time or rate of learning are largely a function of the preparatory or prior instructional approaches and that for subjects where most of the students have achieved the pre-requisite learning, mastery procedures appear to be able to eliminate the effects of individual differences in social learning approach a vanishing point". Assumptions of Bloom's model of mastery learning are that;

All or almost all students can learn well if:

1. Instruction is systematically approached.
2. Students are provided with adequate help when and where they have learning difficulties.
3. They are given sufficient time to achieve mastery.
4. There is some clear criterion of what constitutes mastery.

He concludes “Mastery approaches have been successfully used in teaching mathematics to biological and social science students”. Bruner (2002) said, “Any subject can be taught effectively in some intellectually honest form to any child at any stage of development”.

Osigwe (2007) said, “Most of the subjects such as mathematics are often taught vaguely without aid to make the teaching-learning process visible and lively”.

On top of it all, the teachers are few in number and they have short teaching experiences and in some cases are of doubtful qualification. To this effect, Fakuade (2004) said “This quality of the generality of mathematics teachers throughout the country leaves much to be desired. In the case of secondary school teachers, although the mathematics content taught to those who have passed through university and advanced Teachers Colleges seems adequate, their exposure to methodology and modern techniques in mathematics is slight. On the whole, the majority of the available mathematics has very short teaching experiences. Again, the in-service training for this category of teachers is inadequate in content and frequency.

Omaze (2003) said “We have many untrained teachers, a shortage of qualified staff, and incessant transfers. This problem becomes more acute in a state that has a free educational program. As no educational system can be better than the quality of her teachers, the solution to this problem lies in professionalizing teaching”. He referred to Imogie (2001) who found out that professional graduate teachers B.Ed (Arts) and B.Ed (Science) had a low rate of turnover than non-professional graduate teachers (B.A/B.Sc university graduate without a certificate).

Again some mathematics teachers in our secondary schools today do not motivate their students enough to learn or study mathematics. Ogunsola (2006) said, “Numerous studies indicate that positive motivational policies and techniques produce not only greater human satisfaction but also higher productivity”.

Poffenbeg and Norton (2003) found that teachers who affect students' attitudes and achievements positively are those who;

- i Display strong interest in the subject.
- ii. Indicate the desire to have students understand the material.
- iii. Display good control of the class without being overly strict.

Earl and Winkle (2004) share the view that “the attitude of the teacher towards a subject area and the teaching of the subject are certainly important variables to consider when describing the teacher’s function within the classroom”. In the words of John Willey and Company (2008), “Improvement in teachers’ interaction with students can affect the students’ achievement and attitude”. Regarding attitudes, they said “dues about the characteristics of classrooms where students own description of their eight classrooms where instruction move at a slower pace, are more goal-directed, are less difficult and where there is better physical environment and less favoritism”. Education in chemistry (2006) remarked that pupils of all abilities respect teachers who obviously enjoy and are knowledgeable about their subjects.

They respect one who is prepared to work hard on their behalf – in less preparation, presentation at their level of understanding and in training for external examinations and will respond by giving of their best efforts”.

Idang (2005) in his study on the problem of teaching mathematics found out that some teachers by their approach discourage their students especially those who are “undecided” by giving the impression that the subject is so difficult that only special people can learn it. They simply mystify the subject by helping to spread the tale that mathematics is esoteric thereby instilling fear into the lazy and the undecided. This he attributed to the fact that the teachers are not conditioned to the proper psychological approach to the teaching of mathematics. They, therefore, scare students away to cover their shortcomings.

As for the actual teaching of the subject, we found that most teachers' approach is wrong. They charge that most teachers do not do enough to motivate the learners by making the subject enjoyable. They say further that most teachers like to use learning by role-method. They just drum the laws into their student and ask them to memorize them.

He also complained of a “teacher-center” approach to instruction and suggests that the teaching of mathematics should be “student-centered”. By this, he means teachers should not dominate the class; rather, it is the student who should. He advocated what is called the inquiry method which is meant, the teacher should pilot or guide the students to discover rules for themselves.

Osigwe (2007) said, “It has only been discovered that in some cases many teachers too form the habit of avoiding some topics prescribed in the syllabus, thereby giving room for half-baked knowledge of the subject”.

Idang (2005) quoted Kalejiaye as saying that present mathematics classes are too large and do not make for class supervision so the size of the classes should be reduced so that teachers will be able to perform.

William (2006) sought to determine “if a class size student attitude did exist among subjects in the database of a large scale evaluation project, compensating for potential making effects of teacher attitude and student achievement. The result of the study revealed that no firm evidence was found to support the belief that a better generation of positive attitudes toward science is directly associated with smaller instructional units at the high school level. This observation will seem to imply little support for theories proposing that effective reactions of students to subject reason may be invoked e.g maintenance of personal identity, individual rapport with the instructor, the opportunity for participation

Southerland (2002) has this to say on social influence “In his population the most important predictors of students attitude towards mathematics were the attitude of father, mother, achievement level and grade level. Turne (2003) reported also that perceived material variables were directed predictors of the expectation of daughters and this was found to be significantly higher in the girls than in the boys as regards the mean level of career expectation.

As for the medium of instruction, Taiwo (2001) said: “The way pupils are introduced to mathematics in many primary schools has been more than anything else responsible for the dread (and at time hatred) that many of them have for the subjects by the time they reach secondary school”. He said that the adverse effect of the use of a foreign language as the medium of education in primary schools cannot be overlooked. It is hard enough for the primary school teacher to explain concepts to the pupils in a way that would make them understand even if he uses his mother tongue. Let alone compelling him to do it in a language of which he can badly claim mastery.

Fakuade (2004) said “With regard to the problems of the children, one should not forget the limitation of the use of a language other than the mother tongue, as the medium of instruction and learning. Although, surveys and researches in this area are still very few, the few available ones support the view that pupils and students are much handicapped in their learning by the use of a foreign language for teaching and learning. The workshop on language and the teaching of science and mathematics with special reference to Africa, sponsored by the Commonwealth Association for Science and Mathematics Education established that the language problem in the teaching and learning of mathematics in Africa is a formidable one. All these are evidence that Eswatini children suffer a great deal of learning limitations both at home and at school.

What can be concluded from this review are;

1. That many students “Fear” mathematics and they see it as an impossible task.
2. That authorities believe that if mathematics is taught well in primary schools students’ attitudes will improve.
3. That the many factors responsible for the attitude of students include the attitude of the teacher himself to the subject, his own limited knowledge, lack of teaching aids, attitude of parents, class size, and the use of foreign language in teaching mathematics.

Methodology

The strategy employed in this research is a descriptive survey. This method enabled the researcher to develop suitable equipment for controlling relevant information (data) from the schools for her study.

Population and Sample

For this study, five secondary schools were selected from Manzini by random sampling. Two of the schools used are boys', 2 girls' schools, and 1 mixed, all of which have been presenting students for school certificates for over five years now. These school certificates; Girls College A, B, C., Boys School D, and E.

There was a total of two hundred (200) students selected randomly from Form 4 and Form 5 in the schools consisting of forty (40) from each school. Twenty (20) from form 4 and twenty (20) from form 5.

The reason for taking the FORM 5 students is that they are sufficiently equipped with the necessary expected background that could enable them to answer questions or express their opinion, views, and attitude towards mathematics and their future career. Qualified mathematics teachers in these schools were used too.

Research Instrument

The research instrument used for this exercise is the questionnaire which was designed for students and teachers. They were designed by the investigation. The questions were aimed at eliciting specified information on causes, effects, and possible solutions to combating truancy.

In all, twenty-two (22) questions were constructed for students and fifteen (15) questions for teachers, all centered on:

- i. Whether students like mathematics.
- ii. The teacher’s teaching method.
- iii. Vocational aspirations of the students.
- iv. Parents influence students' attitudes.
- v. The effect of examination marks on students’ attitudes.

Method of Validation

This instrument was also verified by Bytes Consults Center and has face validity and content validity.

Data Collection Procedures

The questionnaires were self-administered with the help of class teachers in their distribution to the students. The respondents answered the questions individually without discussion with other students. The investigator used one copy of the questionnaire to explain all the items to the subjects.

In addition to this, the researchers were always around for further explanations regarding the questions contained in the questionnaire.

Responses were received from all qualified mathematics teachers in these schools. Out of two hundred questionnaires administered to students, one hundred and seventy-six (176) were collected. Collections of answers raised in Section B of the questionnaires for both students and Teachers and expressed by the following indicators

- A = Agree
- SA = Strongly Agree
- D = Disagree
- SD = Strongly Disagree
- U = Undecided

Data Analysis, Interpretation, and Discussion

The items in the questionnaires were grouped together and analyzed in the order that they are related to a particular hypothesis.

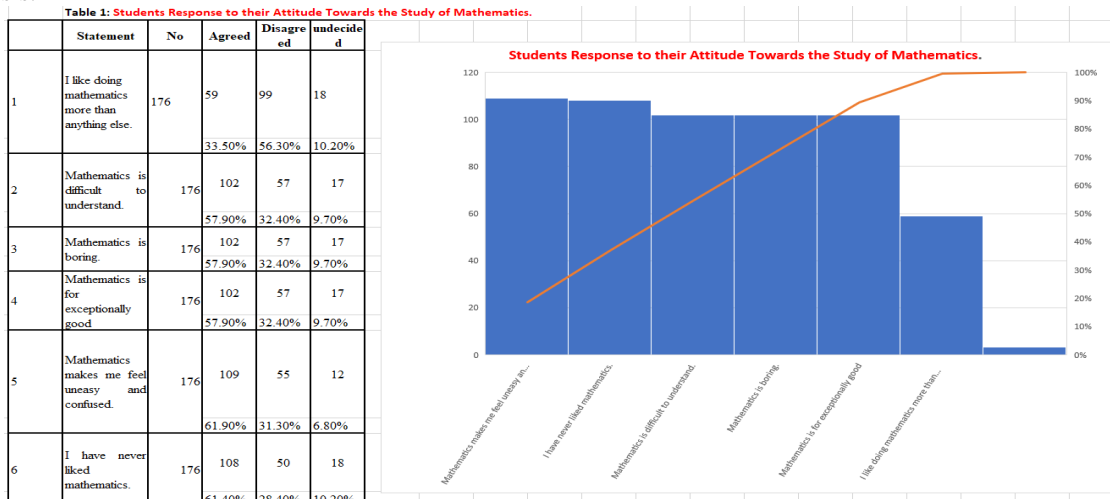


Fig. 1

Students have a negative attitude toward mathematics.

Based on the analysis, it is evident that most students have a negative attitude toward the study of mathematics in secondary schools.

Students' attitudes toward the study of mathematics are influenced by the teacher's method of teaching.

Table 1 Students' Response to the Influence of Teachers on their Attitude

Statement	No	Agreed	Disagreed	undecided
1 I would have liked mathematics if not for how it is taught.	176	94 (53.4%)	72 (40.9%)	10 (5.7%)
2 I like mathematics due to the interesting nature of the lessons is my teacher teaching method.	176	72 (40.9%)	94 (53.4%)	10 (5.7%)
3 My mathematics teachers make the lesson interesting because he/she explains procedures.	176	67 (38.1%)	100 (56.8%)	9 (5.1%)
4 My mathematics teachers always make sure most members of the class are coping up in each lesson.	176	54 (30.7%)	105 (59.7%)	17 (9.6%)
5 My mathematics teacher gives regular assignment.	176	109 (62%)	67 (38%)	-
6 My mathematics teacher uses relevant teaching aids.	176	77 (47.7%)	84 (47.7%)	15 (8.5%)

7	He/she usually give price to the person that score the highest marks in mathematics test.	176	-	141 (80.1%)	35 (19.9%)
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Students' attitudes toward the study of mathematics are influenced by the teacher's method of teaching.

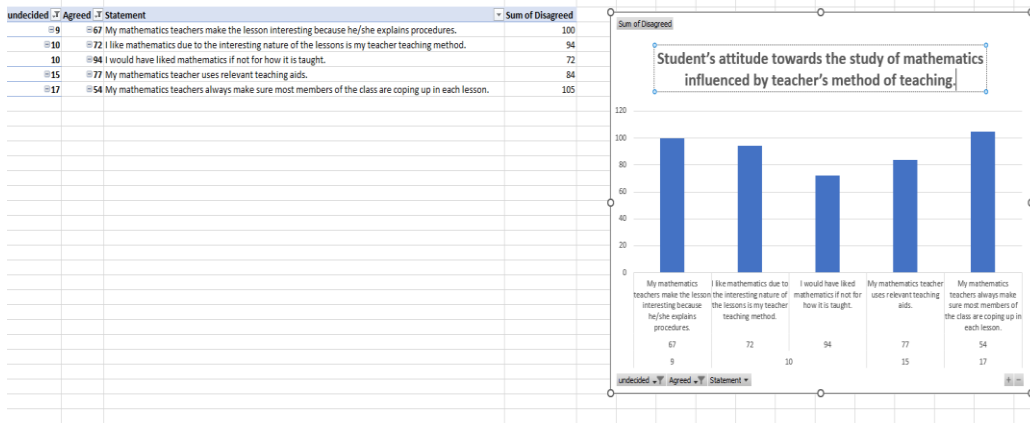


Fig. 2

Students' attitudes toward the study of mathematics are influenced by the teacher's method of teaching. Based on the results, it is evident that the negative attitude of students towards the study of mathematics in secondary school is influenced by the teacher's method of teaching. The hypothesis is therefore validated.

Students' attitude towards mathematics is influenced by their parent.

Students' Response to the Influence of Their Parents towards attitude to Mathematics

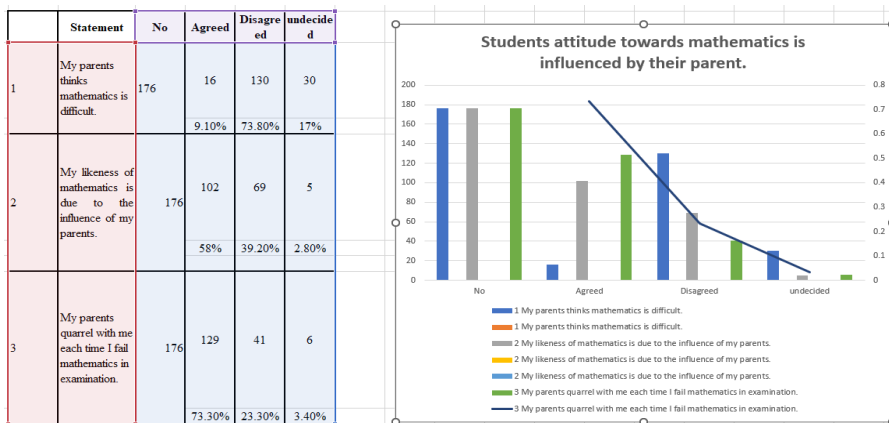


Fig. 3 Students' Response to the Influence of Their Parents towards attitude to Mathematics

Therefore, we can conclude that students' negative attitude towards the study of mathematics in secondary schools is not influenced by their parents. The research question is therefore rejected.

The attitude of students towards mathematics is influenced by their friends.

Students' Response to the Influence of Their Friends towards Attitude to Mathematics

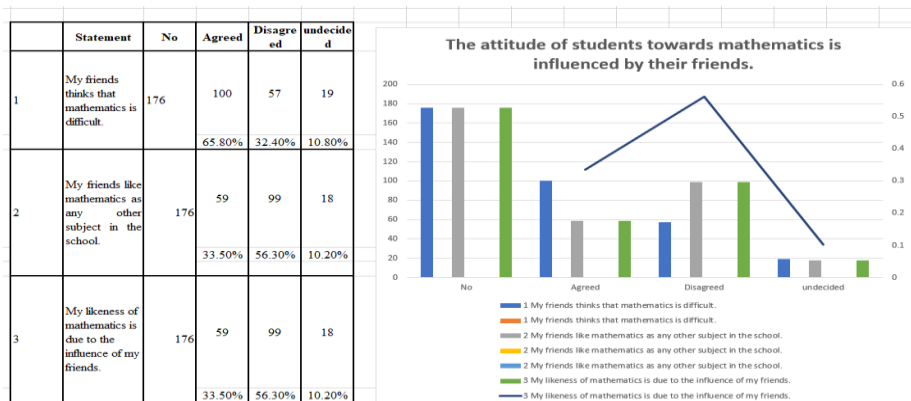


Fig. 4 The attitude of students towards mathematics is influenced by their friends

Teacher’s Response to the Influence of Friends towards students Attitude to Mathematics.

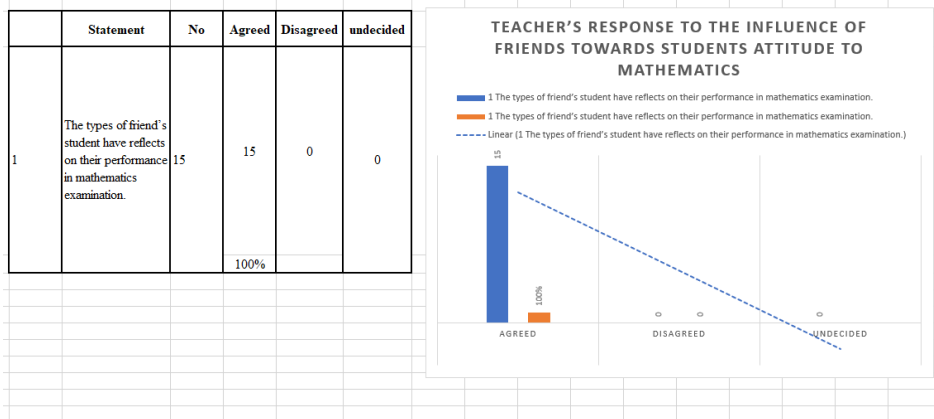


Fig. 5 Teacher’s Response to the Influence of Friends towards students Attitude to Mathematics

Fig 5 reveals that a greater percentage of the students befriend those who think that mathematics is difficult. From the above, it is evident that the attitude of students toward mathematics is influenced by their friends.

The influence of Marks obtained during Examination to their Attitude.

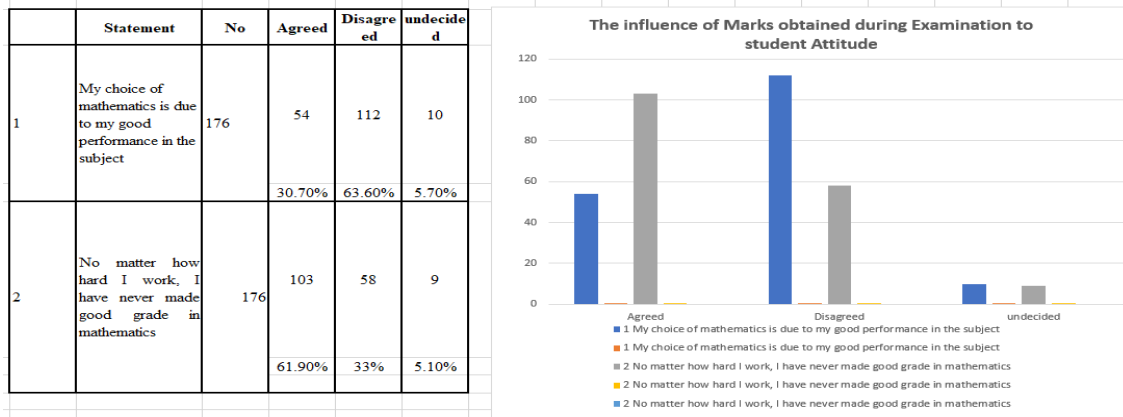


Fig. 6 The influence of Marks obtained during Examination to their Attitude.

Students who do badly in mathematics during examinations have a negative attitude toward the study of mathematics.

Findings and Recommendation

Despite all efforts geared towards scientific and technological development, it is observed that most students still perform very badly in school certificate mathematics examinations. The research was done to investigate the attitude of secondary school students towards mathematics.

Attempts were also made to find out the factors that influence their attitude.

Findings

The study revealed that:

- (1) Most students have a negative attitude toward mathematics. They see mathematics as a boring, difficult subject meant for exceptionally good students. This negative attitude does not augur well for a developing country like Eswatini.
- (2) The student’s attitude towards mathematics is influenced by the teachers’ method of teaching. The teachers do not individualize instruction and as such most members of the class don’t follow up in the lesson. This, the teachers attributed to the large size of the class.
- (3) Parents motivate their children to like mathematics. It was discovered that most parents do not share the view of their children that mathematics is difficult. Most of them quarreled with their children if they fail mathematics.
- (4) The attitude of students towards mathematics is influenced by their friends. The study reveals that most of the students follow friends who share the same view as them in mathematics. Mathematics is difficult, don’t like mathematics, etc.
- (5) Most students who do badly in mathematics during examinations have a negative attitude toward the study of mathematics.
- (6) Students whose vocational aspiration requires mathematics have a positive attitude towards the study of mathematics. Most students aspire to become doctors, and engineers, and develop an interest in the subject. Although most of the students are pointed out by the teacher don’t perform well, the interest already developed help in no small measure to gear them up.

Finally, most of the teachers complained that arithmetic taught in primary school does not make students favorably disposed to study mathematics in secondary schools.

Recommendations

It is recommended that teachers should be more involved in changing the attitude of students. If what one is taught is related to one's environment, the students would be able to grasp the idea easily.

This is contrary to just entering the class to teach topics in mathematics without teaching aids. By so doing, the students will hold firmly to their ideas that mathematics is an abstract and difficult subject. It is also noted that motivation is an essential ingredient in changing students' attitudes. The use of rewards encourages even the very weak students in the class. The reward may change from verbal praise to the presentation of gifts. The idea of calling students blockheads should be discouraged as much as possible, make them understand if they fail today, they will pass tomorrow by putting in more effort.

The science teacher's Association of Eswatini will also be charged with the responsibility of distributing curriculum guides for each class to all secondary schools. This is because this curriculum has columns for objectives to be attained after each topic as well as suggested materials for teaching each topic. This will assist the new teachers in knowing what to do as well as act as orientation for the old ones. There is need also for this association to organize workshops from time to time to keep teachers abreast of the new approaches to teaching some topics. The teachers complained that the period allocated to the teaching of mathematics is inadequate to cover the syllabus and still give individual attention to a large number of students in each class. To this effect, curriculum planners should review the present curriculum to see whether there are some topics that can be deleted.

The government should as a matter of urgency, set into motion a program for training the College of Education and Universities, not to know more about mathematics, but to learn to teach the subject in a way that students will be able to enjoy.

There is a need for equipping the school with audio-visual and other teaching aids to aid teacher's efforts in teaching mathematics and to foster understanding among pupils. Mathematics teachers should be encouraged by paying them their science allowance. The teaching of arithmetic in primary schools should also be reviewed.

Finally, parents should not quarrel with their children for failing mathematics but should also watch the kind of friends the children follows.

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