



# Assessment of Teaching Strategies, Disciplinary Methods, and Their Impact on Pupil Engagement and Attitudes in Primary School Mathematics Classrooms.

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## Abstract

This study aims to explore the correlation between the teaching of mathematics and pupils' attitudes towards the subject, focusing on selected private primary schools in the Mfoundi division. The primary objective is to investigate whether the methods of teaching mathematics influence pupils' attitudes towards the subject.

The study draws upon theories including Brunner's theory of instruction, Bandura's social learning theory, and William's choice theory of motivation. Using a survey design, 65 pupils were randomly selected from seven schools in the Yaoundé IV sub-division. Data was collected through questionnaires, with 65 out of 103 pupils participating. Descriptive statistics and Pearson correlation were employed for data analysis.

Results indicate significant relationships between learning objectives, teaching and learning activities, evaluations of learning, and pupils' attitudes towards mathematics. Based on these findings, recommendations include organizing seminars on mathematics teaching by the inspector of basic education, and encouraging head teachers to ensure that mathematics teachers adequately prepare lessons, utilize learning materials, employ suitable teaching methods, establish clear objectives, and implement effective evaluation techniques.

**Keywords:** Teaching, Mathematics, Pupils' Attitudes, Learning

## Introduction

In Cameroon, Mathematics is often regarded as a challenging subject accessible only to a select few. Many adults express aversion or feelings of incompetence towards the subject, while numerous students opt not to pursue mathematics beyond compulsory education. A widespread sentiment exists wherein individuals harbor a dislike or negative disposition towards mathematics, perceiving it as a domain reserved for a privileged minority. It is viewed

as a barrier preventing pupils and students from pursuing career paths in mathematics and science-related fields (Fisher, 2008).

Negative perceptions and misconceptions about mathematics are prevalent among pupils, particularly in developed countries (e.g., Mtetwa and Gadanis, 2012). Sam (2002) asserts that many students harbor fear of mathematics and feel inadequate when confronted with mathematical concepts.

According to Tall (2002), there is growing concern regarding the significance of mathematics to individuals and society as a whole. He argues that mathematics plays a pivotal role in enabling individuals to realize their full potential in life and pursue their priorities, thereby contributing to the economic prosperity of the country.

Tall (ibid) further poses thought-provoking questions regarding the study of mathematics: Why should mathematics be taught in schools, and who should be responsible for its instruction? How should educators be trained? Should the curriculum prioritize practical applications and societal needs or focus more on theoretical aspects? As education progressed in the 15th and 13th centuries, greater emphasis was placed on the importance of mathematics due to its influence on other academic disciplines and citizens' professional lives.

The purpose of education extends beyond the mere achievement of predefined goals and objectives; it encompasses participation in a discourse that shapes and influences our thinking, relationships, and behavior.

### **Statement of the problem**

The fundamental goal of education is to facilitate learning, and the gauge of successful learning lies in the attitudes of pupils. In Cameroon, substantial investments have been made by the government in teacher training and school infrastructure. However, the efficacy of mathematics education in primary schools has been on the decline. This is attributed to various factors, including inadequate teaching strategies and disciplinary methods that fail to engage pupils effectively.

Many teachers exhibit a limited repertoire of teaching techniques, relying on a single method without fostering interactive learning environments. This rigid approach, coupled with punitive disciplinary measures, often leads to disengagement and negative attitudes among pupils. Tsafack (2003: 50) underscores the importance of instilling desired behaviors in individuals through appropriate guidance and instruction.

Illustrating this, Tanah (2013) recounts the case of a mathematics teacher whose uninspired teaching methods resulted in student apathy and disinterest. The repetitive nature of instruction, lacking in innovation and engagement, led to student boredom and disengagement from the subject. Recognizing the decline in pupil attitudes towards mathematics and its potential link to teaching methods, the researcher poses the central inquiry: Is there a discernible relationship between the teaching of mathematics and pupils' attitudes?

## Research Objectives

- To assess the teaching strategies employed by mathematics teachers in primary schools.
- To examine the disciplinary methods used in mathematics classrooms and their impact on pupil engagement.
- To investigate the correlation between teaching methods and pupil attitudes towards mathematics.

## Research Questions

- What are the prevailing teaching strategies utilized by mathematics teachers in primary schools?
- How do disciplinary methods employed in mathematics classrooms influence pupil engagement and attitudes towards the subject?
- Is there a measurable relationship between the teaching methods employed and pupils' attitudes towards mathematics?

## Research Hypotheses

- **Ha:** There is a relationship between teaching methods and pupils' attitudes mathematics.
- **Ho:** There is no relationship between teaching methods and pupils' attitudes mathematics.

## Literature Review

### Teaching Methods/Learning Activities and Pupils' Attitudes Towards Mathematics

The process of teaching involves interaction between the teacher and the learner, with the aim of eliciting behavioral change in the pupil. Gobler (1977) defines teaching methods as the broad principles, pedagogic strategies, and classroom management techniques employed during instruction. The selection of teaching methods is contingent upon various factors such as educational philosophy, classroom dynamics, student demographics, subject matter, and school mission statements. Generally, teaching methods can be categorized into two approaches: teacher-centered and learner-centered.

Teacher-centered approaches to learning position the teacher as the primary authority figure. In this model, pupils are perceived as "empty vessels" tasked with passively receiving information through lectures and direct instruction (Fonche, 2005). The primary responsibility of the teacher is to impart knowledge to the pupils, with teaching and assessment viewed as distinct entities. In contrast, learner-centered approaches to learning afford both teachers and pupils equal roles in the learning process. While the teacher remains an authority figure, their primary function is to

facilitate and coach pupils' understanding of the material, incorporating activities such as group projects, student portfolios, and class participation into the instructional process.

To delve deeper into these approaches, it is essential to explore three primary teaching styles in educational pedagogy: direct instruction, inquiry-based learning, and cooperative learning. Direct instruction, characterized by explicit teaching through lectures and teacher-led demonstrations, is predominant in teacher-centered approaches. Inquiry-based learning emphasizes hands-on investigation and exploration, with the teacher serving as a facilitator guiding pupils through the learning process. Cooperative learning fosters a sense of community and collaboration among pupils, utilizing group activities such as "think-pair-share" and reciprocal teaching to enhance academic and social development.

Reflecting on these methods, Moore (2001) underscores the motivational benefits of group activities and student-centered teaching strategies such as cooperative learning, which promote a sense of recognition and belonging among pupils. Santrock (2004) highlights the importance of interactive teaching, particularly through structured discussions, in fostering social skills and rational thinking among pupils. Socken (1992) emphasizes the role of discussion as a collaborative problem-solving tool, enabling both teachers and pupils to gain insights and knowledge through shared dialogue.

Bandura (2000) stresses the significance of aligning teaching styles with personal values and student learning preferences to optimize learning outcomes. Similarly, Tanah (2013) underscores the importance of sustaining pupils' attention through varied instructional techniques, such as movement, changes in voice, and interactive patterns, to mitigate boredom and foster engagement.

In summary, effective mathematics instruction necessitates a diverse repertoire of teaching strategies and active engagement from both teachers and pupils. By implementing student-centered approaches and fostering a supportive learning environment, educators can cultivate positive attitudes towards mathematics and enhance learning outcomes.

## **Methodology**

### **Research Design**

Kenner et al (1996) elucidate that research design serves as a framework delineating the type of information to be gathered, the source of data collection, and the research procedure or pattern. The research design adopted for this study is the survey research design. According to Nworgu (1991:55), a survey design involves the study of a group of individuals by collecting and analyzing data from a select few deemed representative of the entire group. Thus, a research design serves as a plan or blueprint specifying how data related to a given problem should be collected and

analyzed. In this study, opinions and feelings from respondents' questionnaires were utilized. This research design was chosen due to the substantial size of the population, and its widespread use in educational research.

### Population of the Study

Amine (2005) defines population as the complete collection of all elements of interest to a particular investigation. In this study, the population comprises all pupils in the Yaoundé IV sub-division, Center Region of Cameroon.

### Target Population

The target population encompasses all the elements on which the researcher will conduct actions for the research. It is a subset of the overall population and consists of pupils from selected primary schools in the Yaoundé IV sub-division.

**Table 1: Target Population**

N°	Name of schools	Number of pupils	Percentage (%)
1	Complexe scolaire dream school odza	20	19.4
2	GOD BLESS BILINGUAL NURSERY AND PRIMARY SCHOOL ODZA	22	21.4
3	LADY BIRD NURSERY AND PRIMARY SCHOOL ODZA	20	19.4
4	OLYMPIC GLORY BILINGUAL NURSERY AND PRIMARY SCHOOL ODZA	15	14.6
5	PINNACLE OF SUCCESS NURSERY AND PRIMARY SCHOOL ODZA	8	7.8
6	ST JOSEPH NURSERY AND PRIMARY SCHOOL ODZA	8	7.8
7	FOUNDATION BILINGUAL NURSERY AND PRIMARY SCHOOL ODZA	10	9.7
	Total	103	100

### Accessible Population

The accessible population comprises the actual number of pupils the researcher could reach or access. In this study, the accessible population includes pupils from selected primary schools in the Yaoundé IV sub-division.

**Table 2: Distribution of Accessible Population**

N°	Name of schools	Number of pupils	Peentages (%)
1	Complex scolaire Dream school	20	30.8
2	GOD BLESS BILINGUAL NURSERY AND PRIMARY SCHOOL ODZA Yaounde	22	33.9
3	LADY BIRD NURSERY AND PRIMARY SCHOOL ODZA Yaounde	15	23.1
4	OLYMPIC GLORY BILINGUAL NURSERY AND PRIMARY SCHOOL ODZA	8	12.3
	<b>TOTAL</b>	<b>65</b>	<b>100</b>

The table above depicts the schools from which the researcher accessed the actual number of pupils, along with their respective percentages.

### Sample and Sampling Techniques

A sample, as defined by Nwana (1998), is a subset of the population studied. It is drawn through a specific procedure from a particular population. Sampling techniques refer to the methods used by the researcher to obtain the sample for the study.

### Random Sampling Technique

Mbua (2003) describes random sampling as a method used by researchers to select a precise number of items or individuals to work with. This technique ensures that each member of the population investigated has an equal chance of being selected on their own merit, rather than being chosen based on predetermined criteria that may disadvantage them. In this study, the desired sampling population was 65 pupils. The selection process began with the random selection of schools. The researcher assigned names of schools in the Yaoundé IV Sub-division to pieces of paper, folded them, and placed them in a box. The first four schools drawn were selected without replacement. Subsequently, to determine the number of pupils, the researcher wrote "YES" and "NO" on pieces of paper, folded them, and shuffled them in a basket. Pupils were then asked to randomly pick a paper from the basket without replacement. After this process, 65 pupils picked "YES" and were selected.

**Table 3: Distribution of Schools and Sample Size**

N°	Name of schools	Number of pupils	Percentages (%)
1	Complex scolaire Dream school	20	30.8
2	GOD BLESS BILINGUAL NURSERY AND PRIMARY SCHOOL ODZA Yaounde	22	33.9
3	LADY BIRD NURSERY AND PRIMARY SCHOOL ODZA Yaounde	15	23.1
4	OLYMPIC GLORY BILINGUAL NURSERY AND PRIMARY SCHOOL ODZA	8	12.3
	TOTAL	65	100

Table 3 illustrates the source of the sample and its distribution across various schools, along with the corresponding percentages. The most populated schools had twenty-two and twenty pupils each, while the least populated had eight pupils.

To ensure the representativeness of the sample, the sampling rate was calculated using the formula:  $\text{sample/accessible population} \div 100$ .

### **Description of the Instrument Used for Data Collection**

The principal instrument utilized for data collection in this study was the questionnaire. It was chosen due to its ability to yield precise and objective responses, cost-effectiveness, and convenience in dealing with multiple respondents. The questionnaire comprised 21 questions related to the hypotheses, presented in fixed-response format and addressed to all sampled pupils. Additionally, the questionnaire was divided into sections for pupils and teachers, covering various aspects related to pupils' attitudes towards mathematics.

### **Validity of the Instrument**

Validity, as defined by Amine (2005:285), pertains to the instrument's ability to produce accurate results and measure what it was designed to measure. After constructing the questionnaires, they were reviewed by colleagues and the project supervisor for feedback and suggestions to enhance their quality and relevance to the study objectives. The supervisor confirmed the content validity of the instrument after evaluating its alignment with the study objectives.

### **Reliability of the Instrument**

Reliability, according to Amine (2005:293), refers to the consistency of the instrument in yielding the same results when repeatedly used to measure traits or concepts from the same respondents. A pilot test involving six pupils from a similar demographic group was conducted to assess the questionnaire's reliability. After two weeks, the same

questionnaire was administered to the same pupils, and the consistent results obtained affirmed the instrument's reliability.

### Administration of the Instrument

The questionnaires were distributed face-to-face to the selected schools to allow for clarifications and explanations as needed. The questionnaires were coded numerically to facilitate matching between teachers' and pupils' responses. Subsequently, the questionnaires were collected from both pupils and teachers, achieving a 100% return rate.

### Procedure of Data Collection

The researcher obtained authorization from the head teachers of the selected schools before administering the questionnaires. After securing permission, the questionnaires were distributed to teachers in various classes, and pupils were given two hours to complete them. The researcher collected the filled questionnaires from the pupils after the stipulated time, ensuring a 100% return rate.

### Description of Statistical Tools for Data Collection

The questionnaire served as the instrument for data collection, while the statistical tool for data analysis was the chi-square ( $\chi^2$ ) test, which examines the dependence of one variable on another.

### Data Analysis Technique

Data analysis involved using percentages and chi-square calculations to analyze and verify the research hypotheses. The chi-square calculation aimed to determine the relationship between variables in the study, with observed frequencies compared to expected frequencies.

### Results and Discussion

#### Descriptive Analysis

**Table 4: Distribution of respondents' opinion on teaching methods/materials.**

Items on learning objectives		characteristics	Responses	
			Frequency	Percentage
1.	Do you pair learners with the same abilities to facilitate teaching?	very often	15	23.1%
		Often	25	38.5%
		scarcely	25	38.5%
		Total	65	100.0%
2.	Do you start teaching from specific to general (inductive approach)	very often	20	30.8%
		Often	20	30.8%
		scarcely	25	38.5%
		Total	65	100.0%
	Is peer teaching encouraged?	very often	10	15.4%

3.		Often	20	30.8%
		scarcely	35	53.8%
		Total	65	100.0%
4.	Do you adequately explain and answer questions during teaching?	very often	15	23.1%
		Often	25	38.5%
		scarcely	25	38.5%
		Total	65	100.0%
5.	Are your learners learning more when they are active?	very often	25	38.5%
		Often	25	38.5%
		scarcely	15	23.1%
		Total	65	100.0%
6.	Is your teaching method enabling you to have full control in your presentation?	very often	15	23.1%
		Often	20	30.8%
		Scarcely	30	46.2%
		Total	65	100.0%

As it can be viewed from table 4 above, item 1 indicates that 15(23.1%) of the respondents' opinions were very often, 25(38.5%) respondents' opinions were often and 25(38.5%) were scarcely with the view that they pair learners with the same abilities to facilitate teaching.

Item 2 establishes respondents' opinions on whether they start teaching from specific to general. Results from the table above reveal that 20 (30.8%) of the respondents were very often, 20(30.8%) of the respondents were often and 25(38.5%) were scarcely. This show that many teachers usually teachers usually teach from general to specific instead of the inductive method.

Item 18 establishes the respondents' opinions on whether they encourage peer teaching. Results from the table above reveals that 10(15.4%) of the respondents were very often in their opinions, 20(30.8%) of the respondents were often and 35(53.8%) were scarcely. This shows that most teachers scarcely encourage peer teaching in their mathematics lessons.

Item 19 was to find out the respondents' opinions on whether they adequately explain and answer questions during teaching. Results on the table above indicate that 15 (23.1%) respondents gave their opinions showing very often, 25(38.5%) respondents gave their opinions showing often and 25(38.5%) were scarcely. This shows a great number of teachers' hardly or scarcely difficult concepts in their classes.

Item 20 investigated the respondents' opinions on whether their learners learn more when they are active. Results on the table above indicate that 25 (38.5%) respondents were very often, 25(38.5%) respondents were often and 15(23.1%) responses were scarcely. This shows that most learners learn more when they are active.

Item 21 investigated the respondents' opinions on whether the teaching method enables them to have full control in their presentation. From the table above, 15(23.1%) of the respondents' opinions were very often, 20(30.8%) responses were often and 30(46.2%) responses were scarcely. This shows that majority do not use teaching method that enables them to have full control in their presentation. This makes the teaching of mathematics to be very difficult for most teachers.

**Table 5: Pupils' responses on their attitudes toward the teaching of mathematics.**

Items on pupils attitudes		characteristics	Responses	
			Frequency	Percentage
1	Do you have mathematics lessons in your class?	Yes	50	76.9%
		No	15	23.1%
		Total	65	100.0%
2	Do you enjoy lessons on mathematics?	Yes	20	30.8%
		No	45	69.2%
		Total	65	100.0%
3	When your teacher is teaching mathematics, do you make noise in with your friends?	Yes	40	61.5%
		No	25	38.5%
		Total	65	100.0%
4	Does your teacher allow you to think of solution first before showing you how it is done?	Yes	15	23.1%
		No	50	76.9%
		Total	65	100.0%
5	Does your teacher insult you during mathematics Lesson?	Yes	50	76.9%
		No	15	23.1%
		Total	65	100.0%
6	Do you always go early to school?	Yes	10	15.4%
		No	55	84.6%
		Total	65	100.0%
7	Do you loiter around the school compound during Mathematics lessons?	Yes	15	23.1%
		No	50	76.9%
		Total	65	100.0%
8	Do you love the way your teacher teaches Mathematics?	Yes	25	38.5%
		No	40	61.5%
		Total	65	100.0%
9	Do you love the subject?	Yes	10	15.4%
		No	55	84.6%
		Total	65	100.0%
10		Yes	15	23.1%

	Does your teacher give you work in group to do?	No	50	76.9%
		Total	65	100.0%
11	Did you perform well in the last exams?	Yes	15	23.1%
		No	50	76.9%
		Total	65	100.0%

Item 1 was to sample respondents' opinions whether they have mathematics lessons in their class. Results from the table above reveal that, 50 (76.9%) responses were yes and 15(23.1%) responses were no showing that mathematics is compulsory for every pupil in the primary school.

Item 2 was to sample pupils' opinions whether they enjoy mathematics lessons. From the table above, 20(30.8%) responses were yes and 45(69.2%) responses were no. This means that most pupils do not enjoy mathematics lesson making it difficult to change their attitude.

Item 3 investigated respondents' opinions on whether they make noise when their teacher is teaching mathematics. Results from the table above shows that 40(61.5%) responses were yes and 25(38.5%) responses were no. This means that many pupils make noise when their teacher is teaching mathematics.

Item 4 was to sample pupils' opinions whether their teacher allow them to think of solution first before showing them how to do it. From the table above, 15(23.1%) responses were yes and 50(76.9%) responses were no. This means that many teachers always use teacher's centered approach to teach mathematics forgetting the individual needs of pupils.

Item 5 investigated respondents' opinions on whether their teachers insult them during mathematics lessons. Results from the table above shows that 50(76.9%) responses were yes and 15(23.1%) were no. This means that most teachers insult their pupils during mathematics lessons instead of supporting and encouraging them to have a positive attitude towards mathematics.

Item 6 investigated pupils' opinions whether they always go to school early. From the table above, 10(15.4%) responses were yes and 55(84.6%) responses were no. This shows that many pupils always come late to school. This means that they always miss mathematics lessons or attend partially as they are always first periods on the timetable.

Item 7 was to investigate respondents' opinions on whether they loiter around the school compound during mathematics lessons. Results from the table above shows that 15(23.1%) responses were yes and 50(76.9%) responses were no. This means that when many pupils beg permission to go to the toilet during mathematics lessons, they feel reluctant to return and decide to loiter outside.

Item 8 investigated pupils' opinions on whether they love the way their teacher teaches mathematics. Responses from the table above show that 25(38.5%) were yes and 40(61.5%) were no. This means many pupils don't love the way their teacher teaches mathematics making it very difficult for the lesson objectives to be attained.

Item 9 was to sample pupils' opinions on their love for mathematics. From the table above, responses show that 10(15.4%) were yes and 55(84.6%) were no. This shows that many pupils do not love the subject due to many reasons such as the feeling that it is difficult, poor teaching methods and many others.

Item 10 investigated pupils' opinions on whether their teacher gives them group work to do. Responses from the table show that 15(23.1%) were yes and 50(76.9%) were no. This means that most teachers do not give group work thus neglecting peer teaching and making it difficult to identify slow learners in the subject.

Item 11 was sample pupils' opinions on their performance in the last exams. From the table above 15(23.1%) accepted that they performed well and 50(76.9%) refused that they did not perform well. This means that many pupils always fail in mathematics thus making many of them to have a negative attitude towards it.

### Test of Hypothesis

- **Ha:** There is a relationship between teaching methods and pupils' attitudes mathematics.
- **Ho:** There is no relationship between teaching methods and pupils' attitudes mathematics.

**Table 6: Pearson correlation statistics on teaching methods/materials and pupils attitudes.**

Correlations			
		Teaching methods/materials	Pupils' attitude
Teaching methods/materials	Pearson Correlation	1	.954**
	Sig. (2-tailed)		.000
	N	65	65
Pupils attitudes	Pearson Correlation	.954**	1
	Sig. (2-tailed)	.000	
	N	65	65

\*.Correlation is significant at the 0.05 level (2-tailed)

Table 6 indicates that there is a very high positive relationship between teaching methods/materials and pupils' attitudes in the teaching of mathematics ( $r = 0.954$ ). The relationship is statistically significant (Sig. = 0.000) at 0.05 level of significance. This implies that 95.4% of pupils' attitudes towards the teaching of mathematics depend on teaching methods/materials. Thus, the study findings indicated that there is a very high positive relationship between teaching methods/materials and pupils attitudes towards the teaching of mathematics. With this, the null hypothesis that there is no relationship between teaching methods/materials and pupils' attitude towards the subject was rejected and the alternative hypothesis accepted. It is safe to conclude that teaching methods/materials of teachers greatly influence pupils' attitudes towards the teaching of mathematics.

### Implication and Conclusion

The findings indicated that there is a very high positive relationship between teaching methods/materials and pupils' attitudes in the teaching of mathematics ( $r = 0.954$ ). The relationship is statistically significant (Sig. = 0.000) at 0.05 level of significance. This implies that 95.4% of pupils' attitudes towards the teaching of mathematics depend on teaching methods/materials. This ranges from teachers pairing learners with the same abilities to facilitate teaching to using a teaching method to have full control in your presentation. Thus, the study findings indicated that there is a very high positive relationship between teaching methods/materials and pupils attitudes towards the teaching of mathematics.

The study showed that the relationship between teaching methods/materials of teachers in mathematics and pupils' attitudes towards the subject in private primary schools in Yaounde IV sub-division were found to be very high. These would have very high significant influence on pupils' attitudes towards the teaching of mathematics. Thus, teachers who master and use diverse teaching methods and materials which are both learners' and teachers centered very well following the stated questions are bound to influence pupils' attitudes towards mathematics in a highly positive way. It is very true to also conclude that teachers who fail to master and use diverse teaching methods and materials which are both learners' and teacher's centered very well in teaching mathematics are bound to influence pupils' attitudes towards mathematics in a highly negative way.

### **Recommendations**

Based on the above conclusions, the following recommendations were forwarded to be the remedy of the

#### **To Pedagogic Inspectors**

- ❖ The pedagogic inspectors should organize seminars and workshops on how to teach mathematics and to fully equip the teachers with necessary skills to improve on the teaching of mathematics.
- ❖ The pedagogic inspectors should closely and frequently follow up teachers in their classrooms to evaluate how they teach mathematics so that they will have an up to date knowledge and competence in the subject.

#### **To the head teachers**

- ❖ The head teachers should be an eye opener to the teachers to make them prepare their mathematics lessons well use didactic or learning materials during the lessons, use appropriate teaching methods/materials, good learning objectives, and uses good evaluation techniques. Above all this will help teachers to come out with excellent results and also to help pupils to love and develop a positive attitude towards mathematics.

## To the teachers

- ❖ The teachers are recommended to draw their mathematics lesson objectives based on the three levels of the Bloom's Taxonomy and to follow the standards set by the ministry of basic education, this will help teachers to influence pupils' attitudes positively.
- ❖ The teachers are recommended to master their lesson contents very well before going in to the classroom to teach mathematics so as to positively impact pupils' attitudes towards the subject.
- ❖ Teachers are recommended to select good teaching methods and good teaching materials that will enable them to have full control of their class presentation which are up to date to positively influence pupils' attitudes towards mathematics.
- ❖ Teachers are recommended to select good assessment techniques to evaluate their pupils so as to positively influence pupils' attitudes towards mathematics.

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