

The Role of Mathematics Teachers towards Enhancing Students' Participation in Classroom Activities

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ABSTRACT This study was undertaken to determine the role of Mathematics teacher towards enhancing students' participation in classroom activities. Eighty Mathematics teachers (40 males and 40 females) of public schools from Tafila city were involved in the study. Twenty schools out of 112 chosen randomly from the public schools of Tfila. The study focused on five domains of activities, which are practiced in classroom. The domains are teaching style, quality of teaching, kinds of decisions based on homework performance, classroom assessment and kinds of feedback based on assessment outcomes. The results of the study indicated that the teachers play significant role towards enhancing students' participation in classroom activities due to teachers' gender in favor of females.

INTRODUCTION

Large-scale comparative international and national surveys continue to show poor performance of students in Mathematics. Given such consistently poor productivity, much research has sought to identify students in school and out-of-school experiences that influence achievement and related outcomes especially those that are alterable or partly alterable by educators and could be manipulated by policy makers.

Research in western countries has shifted attention away from school-lever factors to learning environment of the classroom (Saburoh, Shyoichi 1984). In fact, all factors that contribute to educational outcomes exist in one way or another in classrooms that differ in terms of learning environments. They have unique effects on pupils learning independently of factors operating at school and individual levels (Richard 1994).

The classroom activities influence on students achievement is two or three times more than the school level. Classroom teaching is nearly a universal activity designed to help students to learn. It is the process that brings the curriculum into contact with students and through which educational goals are to be contacted with students and through which educational goals are to be achieved. The quality of classroom teaching is a key to improving students learning (Brown et al. 2003).

Although, setting standards for content and performance is an important first step, but merely

doing so and holding teachers accountable will not improve students learning (Anderson, Brophy 1998). Accordingly, particular attention should be paid to the actual process of teaching. However, a number of studies in classroom activities provide the critical link between students' achievement data and teacher practices at classroom level, this link is unfortunately lacking in most national education surveys (Smith 1987).

Teaching and assessment are rarely studied at level, but education policy is often discussed nationally. It is important to know what aspects of teaching and assessment contribute significantly to achievement so that national discussions of classroom practices focus on the typical experiences of students (Richard 2003).

Accordingly, research is needed to answer questions raised about the role of Mathematics teachers towards enhancing students practices related to instructional activities and classroom assessment environment.

Instructional Activities

Findings of research suggested that several classroom instructional activities were associated with achievement and noted that the ways in which instructional activities are presented in classroom context affects student achievement (Sewell 1984; Anderson and Brophy 1998; Cooper 1998). Moreover, Sommer (1999) found that quality of instruction influence achievement at the class level.

Instructional activities in class include variables that describes aspects of classroom instruction such as quality of teaching style and opportunity to learn.

Quality of Teaching

The teaching context is established through preconceptions held by the teacher about the process of learning and how that might be facilitated (Mouly 1982). Perceptions of the learning process at various levels of constructive inform different teaching practices which in turn lead to modification of the students' perception of the learning environment. It found that quality of teaching was a significant predictor of student achievement even after controlling for effects of students characteristics (Sommer 1999). In addition, Cavas (2002) found that quality of teaching did not have statistically significant effect on achievement at classroom level.

Teaching Style

An important part of any instructional setting is the teaching style. Research results suggested that teaching style exerted effects on student achievement that were independent of students' characteristics (Smith 1987). The promise "one teaching style fits all" which is attributed to a teacher-centered teaching style is not working for a growing number of diverse student population. Problems occur when teaching styles conflict with students learning styles, often resulting in limited learning or no learning. Haladyna and Shaughnessy (1983) offers learner-centeredness as a model for responding to classroom challenges because of its viability for meeting divers needs.

Both teaching styles (teacher and learner-centered) recognize the student as a key factor in improving student achievement. The teacher – centered style places control for learning in the hands of the teacher who decided what students would learn and how the teacher uses his expertise in content knowledge to help learner make connections.

Teacher provides a variety of instructional methods and techniques for helping learners construct their learning and develop a system for applying knowledge and theory (Brown et al. 2003).

Cooper (1998) found that student learn more in classes where they spend most of their time

being taught or supervised by teachers, rather than working on their own.

Opportunity to Learn

One of the main factors related to achievement scores is opportunity to learn which refers to the amount of time students are given to learn the curriculum. The extent of the students' opportunity to learn content bears directly and decisively on student achievement (Saburoh and Shoyoichi 1984).

In addition, homework is seen as a contribution towards students' learning, extending the curriculum beyond the classroom and it can be conceived as one facet of opportunity to learn in the sense that home assignments offer students the opportunity to continue school work after regular school hours. Anderson and Prophy argued that through homework assignments teachers could be assured that students did their learning time beyond school hours (Anderson and Prophy 1998).

Homework could be considered as a proxy measure for the degree to which teachers academically challenged "pressed" their students. While doing homework in Mathematics, of the important subjects, are the amount, type and efficiency of homework may also be important.

Research has indicated that the amount of homework given by teacher was found to have contradictory effect on achievement. For instance, Baumer showed that the frequency of homework assignments had a positive effect on achievement gains (Baumer 2002). Cooper observed a positive linear relationship between hours per week spent on homework (5 to 10 hours) and achievement through examining 27 studies, also Cooper reported that the average correlation between time spent on homework and achievement was 0.21 (Cooper 1998).

The assignment of appropriate homework can stimulate independent engagement in learning tasks. According to Gerades textbook-based homework was associated with higher achievement (Gerades 1991).

Whilst working on textbook problems and on projects were associated with lower test scores, regulate review of student homework can provide insight into student progress and source of problems. A clear message needs to be conveyed to students that responsibility to do the home-work is the same as the responsibility to work in class.

The Classroom Assessment Environment

The classroom assessment environment has been defined as the context created for learners by several aspects of teachers' use of formative and summative evaluations of their work, and assessment should as far as possible be integral to the normal teaching and learning programmed. For instance testing should be considered as an opportunity to learn (Anderson and Propy 1998).

In addition, teachers know how students are progressing and where they are having trouble, they can use this information to make necessary instructional approaches of offering more opportunities for practice (Smith 19887).

Feedback is required because students need information about their accomplishments in order to grow and progress (Gerades 1991). Feedback related to assessment outcomes helps learners become aware of any gaps that exist between their desired goal and their current knowledge understanding skills and guides them through actions necessary to achieve the goal (Richard 1994).

Thus, this study is considered of vital importance for the following reasons:

1. It lights on the important domains of the students' participation in classroom activities that teachers of Mathematics use in their classrooms.
2. It lights on the role of Mathematics teacher towards enhancing students' participation in classroom activities.
3. Help the decision-makers of the ministry of education to know the fact of students' participation in classroom activities.
4. The results of this study are going to contribute to putting solutions in how to enhance students' participation in classroom activities.

The Study Problem

Participation in classroom activities play meaningful role in satisfying educational objectives and raising students personality. Enhancing student's participation in different domains of classroom activities needs to be searched and studied to uncover its fact to know its characteristics and advantages.

Many researchers studied school activities but few of those investigators who studied the role of the teachers of Mathematics towards enhancing students participation in classroom activities. Through observation of teachers, the

researcher found that there are shortages and differences in teacher's role towards enhancing student's participation in classroom activities. Thus, investigator decided to conduct the present study.

Objectives of the Study: The objectives of the present study can be summarized in two items as follow:

1. To uncover the reality of Mathematics teachers of ninth grade towards enhancing students participation in classroom activities.
2. To identify the extent to which this role in activating students' participation differs according to teachers' gender, age, scientific qualifications and residence.

The Questions of the Study: The present study is trying to answer the following questions:

1. What is the reality of Mathematics teachers of ninth grade towards enhancing students' participation in classroom activities?
2. What is the extent to which this role in activating students' participation differs according to teachers' gender, age and scientific qualification?

Study Terminology

- *The Role of Mathematics Teachers:* It is a group of activities expected to be undertaken by mathematics teachers in specific situations to enhance students learning.
- *Mathematics Teachers:* Teachers who are teaching mathematics at ninth grade in public school of Tfila Directorate of Educational.
- *Participation:* Giving the students opportunities to participate by their efforts, thoughts in the problems and activities that are planned by the teachers of Mathematics.
- *Classroom Activities:* Optional studying activities managed by the teachers and students are given Mathematics skills, which are desired to be learned or to be practiced.

MATERIALS AND METHODS

Method and Procedure of the Study: The present study follows the curriculum of survey and description, which fit the nature of the study.

Sample and Instrumentation: The population of this study is all 161 Mathematics teachers who have worked at the public schools of Tfila city in the school year (2008-2009). Twenty schools out of 112 were chosen.

A random sample of teachers (50%) of the population was drawn and distributed into male (40) and female (40) each. Table 1 shows the distribution of the sample of the study by the variables: (gender, age, educational and qualifications).

Table 1: Distribution of the sample of the study according to the variables of the study

Variable	Frequency
<i>Gender</i>	
Male	40
Female	40
<i>Age</i>	
Less than 30 year	10
31-40 year	40
More than 40 year	30
<i>Science Qualification</i>	
Bachelor degree	64
Master degree	16

To achieve the objectives of this study, the researcher reviewed the related literature and designed a questionnaire, which consists of five domains and the domains contain 36 items. The questionnaire is designed to be answered on a five – point-Likert scale of very high degree, medium degree, weak degrees and very weak degree. Table 2 shows the Breakdown of questions items by domain.

Reliability of the Questionnaire: For the purpose of establishing the reliability of questionnaire, Chronobach alpha was used, which yielded a 0.83 coefficient

Validity of the Questionnaire: The validity of the questionnaire was established by showing it to a jury of experts in the field of Mathematics

teaching, curriculum, instruction, assessment, and evaluation. The juries' suggestions, for adding, deleting or modifying certain items were all taken into account in the final stages of the production of the questionnaire.

For the purpose of statistical analysis, the positive items are scaled 5 through 1 respectively where as the negative items are scaled 1 through 5, respectively. The researcher prepared the instrumentation of the study based on the educational literature and pervious studies.

Statistical Treatment: The present study follows the survey and descriptive style. So to answer the two questions of the study, mean, standard deviation and analysis of variance were used.

RESULTS

Displaying the results related to question number one:

Stipulation of question one: What is the role of Mathematics teachers towards enhancing students of nine standard participation in classroom activities.

For answering question, the mean and standard deviation of the five domains and their items were computed according to the estimation of the sample of the study upon the domain instrument of the study as shown in table 3.

Table 3 shows that the domains: Teaching style, Quality of teaching, Kinds of decisions based on homework Performance, Classroom assessment, Kinds of feedback based on assessment outcomes get the ranks of 1, 2, 5, 3, 4,

Table 2: Breakdown of questionnaire items by domains.

No.	Domains	Item number	Total
1	Teaching style	1.2.3.4.5.6.7.8	8
2	Quality of teaching	9.10.11.12.13.14.15.16.17	9
3	Kinds of decisions based on home work performance	18.19.20.21.22.23.24	7
4	Classroom assessment	25.26.27.28.29.30	6
5	Kinds of feed back based on assessment outcomes	31.32.33.34	4
Total			34

Table 3: The mean and standard deviation (SD) of the five domains of the study as estimated by the sample of the study

No.	Domains	Mean	SD	Rank
1	Teaching style	4.53	0.80	1
2	Quality of teaching	4.29	0.74	2
3	Kinds of decisions based on homework Performance	4.19	0.73	5
4	Classroom assessment	4.25	0.72	3
5	Kinds of feedback based on assessment outcomes	4.26	0.79	4
	The whole instrument	4.38		

respectively with their means value 4.53, 4.29, 4.19, 4.25, 4.26. However, the mean for the whole sample of the study was 4.38 and it meets the estimation of very high degrees according to Likert-five-point scales.

Also, the mean and standard deviations for each item belongs to each domain were computed as given in table 4.

The mean and standard deviations for each

item belongs to each domain were computed and as follow:

The First Domain: Teaching style the means and SD of the items of domains number one "Teaching style" as estimated by the sample of the study.

Table 4 shows that item number one with its stipulation "Teacher investigates whether students know the previous learning" gets rank

Table 4: The means and standard deviation (SD) of each item and domain as estimated by the sample of the study

Item/ domains	Domains and items' content	SD	Mean	Rank
<i>Domain (1): Teaching Style</i>				
		4.53	0.80	1st
1	Teacher investigates whether students know the previous learning.	4.87	0.90	1
2	Teacher teaches students how to solve problems.	4.86	0.60	2
3	Teacher enhances the positive behavior.	3.99	0.56	4
4	Teacher asks students vitiate level question.	4.84	0.96	3
5	Teacher helps students to learn math concepts.	3.80	0.69	7
6	Teacher teaches students how to draw.	3.79	0.68	8
7	Teacher asks students what they know related to a new topic.	3.88	0.79	6
8	Teacher asks students to solve will.	3.95	0.86	5
	total	4.25	////	////
<i>Domain (2): Quality of Teaching</i>				
		4.29	0.74	2nd
9	Teacher explains reasoning behind an idea.	4.65	0.95	3
10	Teacher uses tables and charts to clarify the lesson of mathematics.	3.65	0.69	9
11	Teacher asks students to work homework.	4.89	0.98	1
12	Teacher assigns students to test book homework	3.90	0.56	5
13	Teacher assigns students to reading in textbook.	3.75	0.59	8
14	Teacher assigns students to think mathematically	3.80	0.77	7
15	Teacher assigns students to do small investigation in classroom.	4.75	0.79	2
16	Teacher assigns students to do individual project.	3.98	0.96	4
17	Teacher asks students to find uses of the content.	3.85	0.89	6
	total	4.14	0.80	////
<i>Domain (3): Kinds of Decisions Based on Homework Performance</i>				
		4.19	0.73	5th
18	Teacher collects, and keeps homework assignments.	4.23	.87	4
19	Teacher collects, corrects and returns homework assignments.	4.83	.62	3
20	Teacher uses homework to contribute towards students grades.	4.95	.96	2
21	Teacher asks students to correct their own homework assignments in classroom.	3.77	.56	7
22	Teacher asks students to exchange homework assignments and correct them.	3.95	.79	6
23	Teacher uses homework as basis for class discussion.	4.97	.88	1
24	Teacher gives feedback on homework to whole class.	3.99	.89	5
	Total.	4.38	.80	////
<i>Domain (4): Classroom Assessment</i>				
		4.25	0.72	3rd
25	Teacher standardizes test produced	4.02	0.66	4
26	Teacher makes open-ended test and multiple-choice tests.	4.98	0.97	1
27	Teacher gives homework assignments to students.	4.96	0.56	2
28	Teacher asks students to do projects of practical exercises.	3.89	0.83	7
29	Teacher observes students work.	3.95	0.72	5
30	Teacher gives responses to students in class.	4.93	0.84	3
	Total	4.79	////	////
<i>Domain (5): Kinds of Feedback Based on Assessment Outcomes</i>				
		4.26	0.79	4th
31	Teacher provides feedback to students.	4.97	0.65	1
32	Teacher diagnoses learning problems.	4.49	0.93	2
33	Teacher provides grades for students.	3.98	0.82	3
34	Teacher reports to parents.	3.96	0.77	4
	Total	4.35	////	////
	The whole instrument	4.38	////	////

1 with its mean value 4.87 and standard deviation 0.90. Also, item number two which its term “Teacher teaches students how to solve problems” gets rank 2 with its mean value 4.86. Moreover, standard deviation 0.60.

Similarly, item number 4 which its stipulation “Teacher asks students vitiate levels of question” gets rank 3 with its mean value 4.84 and standard deviation 0.96.

Likewise, item number six, whose its term Teacher teaches students how to draw gets the last rank 8 with its mean 3.89 and S.D. of 0.68. Correspondingly, the mean of the whole domains was 4.25 as estimated by the sample of the study. The mentioned mean meets very high degrees according to Likert-five-point scales.

The Second Domain: Quality of teaching the means and SD of the items of domains number two “quality of teaching” as estimated by the sample of the study.

Table 4 shows that item number eleven with its term “Teacher asks students to work home-work”. Gets rank 1 with its mean 4.89 and standard deviation 0.98. Also, item number fifteen which it terms Teacher assigns students to do small investigation in classroom, gets rank 2 with its mean 4.75 and standard deviation 0.79.

Likewise, item number nine whose stipulation is “Teacher explains reasoning behind an idea” gets rank 3 with its mean 4.65 and standard deviation 0.95. Similarly, item number ten Teacher uses tables and charts to clarify the lesson of mathematics gets the last 9 with its mean 3.65 and standard deviation 0.69 correspondingly, the mean of the whole domains as estimated by the sample of the study was 4.14 according to Likert five- point scale, the mentioned mean meets very high degrees.

The Third Domain: Kinds of decisions based on homework performance “the means and means and standard deviations of the items of domains number 3 as estimated by the sample of the study as show in table 4.

Table 4 shows that item number twenty three with it terms “teacher uses homework as basis for class discussions” gets rank 1 with its mean 4.97 and standard deviation 0.86.

Also, item number twenty, which its term “teacher uses homework to contribute towards students’ grades” gets rank 2 with its mean 4.95 and standard deviation 0.96.

Likewise, item number nineteen whose it terms “teacher collects, corrects and returns homework

assignments “gets rank 3 with its mean 4.83 and standard deviation 0.62.

Similarly, item number twenty one which its term teacher asks students to correct their own homework assignments in class” gets the last 7 with its mean 3.77 and standard deviation 0.56.

Correspondingly, the mean of the whole domains as estimated by the sample of the study was 4.38.

According to Likert five-point scale, the mentioned mean meets very high degrees.

The Fourth Domain: Classroom assessment. The means and standard deviations of the items of domains four as estimated by the sample of the study and as shown in table 4.

Table 4 shows that item number twenty-six, which it terms “teacher makes open-ended test and multiple-choice tests” get rank 1 with its mean 4.97 and standard deviation .86.

Also, item number twenty-seven, which it terms “teacher gives homework assignments to students” gets rank 2 with its mean 4.96 and standard deviation 0.56.

Similarly, item number thirty, which it terms “teacher gives responses to students in class” gets rank 3 with its mean 4.93 and standard deviation 0.84.

Likewise, item number twenty-eight which it terms “teacher asks students to do projects of practical exercises” gets the last 6 with its mean 3.89.

Correspondingly, the mean of the whole domains as estimated by the sample of the study was 4.79. According to Likert five-point scale, the mentioned mean meets very high degrees

The Fifth Domain: Kind of feed-back based on assessment outcomes.

The means and standard deviations of the items of domains five as estimated by the sample of the study and as shown in table 4.

Table 4 shows that item number thirty-one whose term is “teacher provides feed-back to the students” gets rank 1 with its mean 4.97 and standard deviation 0.65. Similarly, 4 item number two whose term is “teacher reports to parents” gets the last rank with its mean 3.96 and standard deviation of 0.77.

Display the results of answering question number 2 which stipulation is:

Are there any statistical significance differences in the role of Mathematics teachers towards enhancing students participation in classroom activities caused by teachers’ gender, age and scientific qualifications?

For answering this question, the mean and standard deviation of the sample of the study as estimated by the sample of the study upon the whole instrument and according to the variables of the study as shown in table number 5.

Table 5 shows that there are apparent differences among the means of the sample of the study upon the whole instrument. For determining the level of statistical significance for those in table 6.

Table 6 shows that there are no statistical significant difference caused by age and qualification. Whereas, there is a significant difference caused by the gender variable in favor of female teachers which means that mathematics female teachers role is better than male teachers in enhancing students participation.

DISCUSSION

The results of the study revealed that the highest mean was 4.79, the lowest mean was 4.14, and the five of five domains was 4.38.

Moreover, this mean meets very high degree according to a five – point Likert scale. This result reflects the teachers' awareness of the importance of participation in classroom activates through enhancing students participation in different classroom activities will be given more highlight when discussing the results of each domain of classroom activities as follow.

The First Domain: Teaching Style: Table 4 shows that this domain gets rank number four and the results of the study revealed that three items of the mentioned domain get very high degrees. Item number one teacher teaches students how to converse gets rank one with its mean 4.87. This result shows that the teachers pay much awareness to conversation as a part of classroom activities.

Similarly, item number two teachers teaches students how to solve problems have the rank 2 with its mean of 4.86 this result reflects enthusiasm to intensify students participation in classroom activities. Likewise, item 4 teacher teaches student how to be good listeners with its mean of 4.84. This result reflects that the teacher intensify students participation in classroom activities.

The Second Domain: Quality of Teaching: Table 4 shows that this domain engrossed rank number 5 and the results of study revealed that three items of the mentioned domain secure high degrees. In addition, the results revealed that the mean of the whole items of the mentioned domain was 4.14 and this mean is considered very high according to a five-point of Likert scale. This result mirrors the teachers deepening students' participation in classroom activities.

The Third Domain: Kinds of Decision Based on the Homework Performance: Table 4 shows that this domain occupies rank 2 with its mean 4.38 and the means items 1, 2, 3 and 5 are 4.23,

Table 5: The means and standard deviation(SD) as estimated by the sample of the study upon the whole instrument and according to the variables of the study

Variable	Level	Number	Mean	SD
Gender	Male	40	3.12	0.67
	Female	40	4.24	0.49
Age	Less than 25 years	10	4.11	0.55
	26-35 years	40	4.15	0.61
	More than 35	30	4.13	0.66
Scientific qualification	Bachelor degree	64	4.05	0.59
	Master degree	16	4.16	0.63

Table 6: The results of three-way Analysis of Variance (3-Way ANOVA) for Gender, Age and Scientific Qualification variables effect in teachers role

Source of Variance	Sum of Squares	D F	Mean of Squares	F value
Gender	495.32	1	495.32	7.13*
Age	206.86	2	103.43	1.54
Scientific Qualification	70.82	1	70.82	1.06
Gender x Age	160.12	2	80.06	1.19
Gender x Scientific Qualification	78.88	1	78.88	1.18
Age x Scientific Qualification	74.22	2	37.11	0.55
Gender x Age x Scientific Qualification	70.32	2	35.16	0.52
Error	4556.95	68	67.014	

* Significant P<0.05

4.83, 4.95, 4.97 respectively. The study results show that the previous means are very high and meet a five – point Likert scale.

It could be concluded that this result images teachers high attention to insensate students participation in classroom activities.

The Fourth Domain: Classroom Assessment: Table 4 shows that this domain engrossed rank 1 and the results of the study revealed that four items of the mentioned domain scored high degrees. In addition, the results showed that the mean of whole items of the mentioned domain was 4.79 and this mean is considered very high according to a five – point Likert scale and mirror the teachers need to intensify students' participation in classroom activities.

The Fifth Domain: Kinds of Feedback Based on Assessment Outcomes: Table 4 shows that this domain scored rank 3 and the results of the study revealed that two items out of four of the mentioned domain scored high degrees. In addition, the results showed that the mean of whole items of the mentioned domain was 4.35 and this means considered high according to a five – point Likert scale and reflects willingness to intensify students' participation in classroom activities.

CONCLUSIONS

This study shows that there is a positive role for mathematics teachers of nine grade towards enhancing students participation in classroom activities and the teachers play an important role towards enhancing students participation in classroom activities due to teachers gender, female teachers overcome male teachers.

The rank of the domain come according to the importance of each domain as perceived by the participant as follows, Teaching style, Quality of teaching, Classroom assessment, Kinds of feedback based on assessment outcomes and Kinds of decision based on homework performance.

RECOMMENDATIONS

Because of the important role played by the mathematics teachers in enhancing students

participation in classroom activities, thus teachers have to play this role in an efficient way. Also teachers must encourage students to participate in classroom activities and further studies should be conducted such as studying the problems which limit students' participation in classroom activities.

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