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Teaching of Mathematics at Higher Secondary Level of Malda District

Mr. Md Minarul Hossain

Research Scholar, Education, SunRise University

ABSTRACT:
The importance of mathematics in the school curriculum is undeniable, as it plays a key role in students' educational development. It helps them build knowledge, solve problems effectively, and interact constructively in classroom settings. The responsibility of transforming students into proactive math learners lies heavily on mathematics teachers. They serve as mentors who aid students in acquiring knowledge through guided learning. Yet, the subject often triggers fear in students, developing anxiety and phobia when faced with tough mathematical tasks. Teachers act as pillars of support for students by imparting the right knowledge, using effective teaching strategies, TLMs, and structured evaluation methods. Their guidance helps students build confidence and understanding in mathematics. Therefore, I have chosen the topic *"Teaching of Mathematics at the Higher Secondary Level of Malda District."* In this research, a random sample of 100 mathematics teachers was chosen. The study followed a descriptive and survey-based approach. Through an observation schedule, I assessed their instructional strategies, pedagogical techniques, teaching competencies, use of TLMs, and methods of evaluation.

Keywords: Teaching Mathematics, Teaching Method, Teaching Technique, Teaching Skill, Teaching Learning Material, Evaluation Process.

INTRODUCTION:

Mathematics is a universal discipline, deeply rooted in human civilization, that transcends cultural and geographic boundaries which serves as both a tool and a language for problem-solving and communication across fields like commerce, engineering, and the sciences. Mathematics helps us recognize patterns, analyze systems, and draw logical conclusions, enhancing our understanding of the world and driving progress in technology and daily life. Mathematics teachers are key in transforming students into skilled learners. They serve as mentors who guide and help students expand their knowledge and grasp concepts effectively. Mathematics empowers students to enhance their problem-solving skills and encourages collaborative learning.

RATIONALE OF THE STUDY:

The influence of mathematics on society is profound, as it uniquely nurtures logical analysis and clear reasoning. By helping students distinguish the crucial from the trivial, it sharpens judgment and promotes intellectual honesty. Its role in forming rational and trustworthy minds underlines why it remains an essential part of the educational framework. Mathematics, being a compulsory subject in secondary schools, provides essential preparation for advanced studies. At this educational stage, the manner in which mathematics is taught greatly contributes to students' comprehension and their

enthusiasm for learning mathematical ideas. Mathematics is not just a school subject, it's a powerful tool that helps us navigate everyday problems and sharpens our critical and imaginative thinking. Because of this, it's regarded as one of the most essential support subjects in secondary education. The curriculum is vast, connecting deeply with science, the arts, and many parts of daily living.

STATEMENT OF THE PROBLEM:
"Teaching of Mathematics at Higher Secondary level of Malda District".

OPERATIOAL DEFINITION:
Teaching of Mathematics: 'A practice based pedagogical approach provides the act of imparting mathematical knowledge, methods, calculations etc by teacher to students.
Higher Secondary level:
Higher Secondary level consists of 11^{th} and 12^{th} standards in the educational system. It was followed by West Bengal board Council of Higher Secondary Education Syllabus. The present study selects XI and XII standard students.

RESEARCH OBJECTIVE:
1. To study the methods of teaching mathematics followed by mathematics teachers at higher secondary schools.
2. To study the teaching skill used by mathematics teachers at higher secondary level.
3. To study the teaching technique followed by mathematics teacher at higher secondary level.
4. To study the Teaching Learning Materials used by mathematics teacher at higher secondary level
5. To study the evaluation procedure followed by mathematics teachers at higher secondary level

SCOPE OF THE STUDY:
The scope of the study only the process of mathematics teaching used by mathematics teacher with respect to teaching method, teaching technique and teaching skill of the teacher.

LIMITATION:
1. The study covered only the process of mathematics teaching only.
2. The recent study is limited to higher secondary level schools only.

METHOD:
The methodology adopted for the present research study of schools under Malda district, is a descriptive survey. Survey methods allow researchers to cover a large geographic area at minimal cost. Qualitative as well as quantitative methods will be used.

POPULATION OF THE STUDY:
For the present study the researcher will purposively select the mathematics teachers of higher secondary schools of Malda district.

SAMPLE:
For the present study the researcher will be used as a sample of the mathematics teachers and students of

higher secondary schools of Malda district. In the present study the researcher will randomly select a sample of 100 high schools of Malda district.

TOOLS:

The tool was so developed to translate the objectives of the study in to specific statements, the response likes strategies, method, TLMs, evaluation procedure followed by the teachers for the betterment of students to which will provide the necessary data and explore the area defined by the objectives of the present study.

DATA COLLECTION:

Data-Collection techniques allow us to systematically collect information about our objects of study and about the settings in which they occur.

DATA ANALYSIS AND INTERPRETATION:

The researcher used simple statistic (percentage) conducted her analysis and interpretation of mathematics teacher.

Table-1 (Teaching Method)

SL No.	Teaching Method	Total	Male	Female	Total %	Male %	Female %
1	Inductive & Deductive Method	20	14	6	20	20	20
2	Problem Solving Method	45	30	15	45	42	50
3	Project Method	3	3	0	3	4	0
4	Traditional Method	14	10	4	14	13	13
5	Discovery Method	3	2	1	3	3	2
6	Analysis & Synthesis Method	10	7	3	10	10	10
7	Play-Way Method	5	4	1	5	6	3
		100	70	30			

Above table show that the teaching of mathematics in inductive &deductive method followed by higher secondary school male& female mathematics teachers 20% & 20% respectively, likewise problem-solving method is 42% & 50%, project method is 4% & 0%, traditional method is 13% & 13%, discovery method is 3% & 2%, analysis and synthesis method is 10% & 10% and play-way method 6% & 3%. So, we found that maximum mathematics teacher followed problem-solving methods as a teaching method in their teaching process.

Table-2: (Teaching Skill)

SL No	Teaching Skill	Total	Male	Female	Total %	Male%	Female%
1	Questioning Skill	10	7	3	10	10	10
2	Explaining Skill	24	15	9	24	21	30
3	Reinforcement Skill	28	18	10	28	26	33
4	Variations Skill	3	3	0	3	4	0

5	Group Work & Individual Skill	10	8	2	10	11	7
6	Opening & Closing Skill	12	8	4	12	11	13
7	Class Management Skill	6	6	0	6	9	0
8	Small Group Discussion Skill	7	5	2	7	7	7

Above table show that in the teaching of mathematics the questioning skill followed by higher secondary school male & female mathematics teachers 10% & 10% respectively, likewise explaining skill is 21% &30%, reinforcement skill is 26% & 33%, variations skill is 4% & 0%, group work and individual skill is 11% & 7%, opening and closing skill is 11% & 13%, class management skill is 9% & 0% and small group discussion skill is 7% and 7%.
So, we found that maximum mathematics teacher followed reinforcement skill in their teaching process.

Table-3: (Teaching Technique)

SL No	Teaching Technique	Total	Male	Female	Total%	Male%	Female%
1	Written Work	14	11	3	14	16	10
2	Oral or Mental Work	11	9	2	11	13	7
3	Home Assignment	30	21	9	30	30	30
4	Supervised Study	5	3	2	5	4	7
5	Group Work	16	12	4	16	17	13
6	Review	4	2	2	4	3	7
7	Self-Study	12	7	5	12	10	17
8	Brainstorming	8	5	3	8	7	10

Above table show that the teaching of mathematics written work followed by higher secondary school male & female mathematics teachers 16% &10% respectively, likewise oral or mental work is 13% &7%, home assignment is 30% & 30%, supervised study is 4% & 7%, group work is 17% &13% and review is 3% &7%, self-study is 10% &17%, brainstorming is 7% and 10%.
So, we found that maximum mathematics teacher followed home assignment as a teaching technique in their teaching process.

Table-4: (Teaching Learning Material)

SL No	TLM	Total	Male	Female	Total%	Male%	Female%
1	Blackboard	20	12	8	20	17	27
2	Textbook	25	17	8	25	24	27
3	Interactive Models	7	5	2	7	7	7
4	Calculator	9	7	2	9	10	7
5	Chart & Picture	11	9	2	11	13	7
6	Geometry Box	6	3	3	6	4	10
7	Computer	12	8	4	12	11	13

8	Micro Projector	10	9	1	10	13	3

Above table show that in the teaching of mathematics black board used as teaching learning material by higher secondary school male & female mathematics teachers 17% &27% respectively, likewise textbook is 24% & 27%, interactive models is 7% &7%, calculator is 10% & 7%, chart & picture is 13% &7%, geometry box is 4% &10% and computer is 11% & 13% and micro projector is 13 & 3%.
So, we found that maximum mathematics teacher used textbook as teaching learning material in their teaching process.

Table-5: (Evaluation Process)

SL No	Evaluation Process	Total	Male	Female	Total%	Male%	Female%
1	Performance Assessment	25	17	8	25	24	27
2	Multiple Choice Question	9	7	2	9	10	7
3	Open Response Question	19	13	6	19	19	20
4	Short Investigation	20	13	7	20	19	20
5	Self - Assessment	11	9	2	11	13	7
6	Portfolio	16	11	5	16	16	17
		100	70	30			

Above table show that in the teaching of mathematics the performance assessment followed by higher secondary school male & female mathematics teachers 24% &27% respectively, likewise in multiple choice questions is 10% &7%, open response question is 19% & 20%, short investigation is 19% &20%, self-assessment is 13% &7%, portfolio is 16% & 17%.
So, we found that maximum mathematics teachers followed performance assessment as an evaluation process in their teaching process.

FINDING OF THE STUDY

Objective-1

1. 20% male teacher followed inductive- deductive method as a teaching method of teaching mathematics where as 20% female
2. 42% male teacher followed problem solving method as teaching method of teaching mathematics where as 50% female
3. 4% male teacher followed project method as teaching method of teaching mathematics where as 0% female

4. 13% male teacher followed traditional method as a teaching method of teaching mathematics, where as 13% female
5. 3% male teacher followed discovery method as a teaching method of teaching mathematics, where as 2% female
6. 10% male teacher followed analysis and synthesis method as teaching of mathematics where as 10% female
7. 6% male teacher followed play-way method as teaching of mathematics where as 3% female

Objective-2

1. 10% male teacher followed questioning skill as a teaching skill of teaching mathematics, where as 10% female
2. 21% male teacher followed explaining skill as teaching skill of teaching mathematics where as 30% female
3. 26% male teacher followed reinforcement skill as a teaching skill of teaching mathematics where as 33% female
4. 4% male teacher followed variation skill as a teaching skill of teaching mathematics, where as 0% female
5. 11% male teacher followed skill of organizing small group work and individual work as teaching skill where as 7% female
6. 11% male teacher opening and closing skill as teaching skill of teaching mathematics where as 13% female
7. 9% male teacher followed analysis and classroom management skill as teaching skill where as 0% female
8. 7% male teacher followed small group discussion as teaching skill where as 7% female

Objective-3

a. 16% male teacher followed written work as a teaching technique of teaching mathematics, where as 10% female
b. 13% male teacher followed oral or mental work as a teaching technique of teaching mathematics, where as 7% female
c. 30% male teacher followed home assignment as a teaching technique of teaching mathematics where as 30% female
d. 4% male teacher followed supervised study as teaching technique of teaching of mathematics where as 7% female
e. 17% male teacher followed group work as teaching technique of teaching mathematics where as 13% female
f. 3% male teacher followed review as teaching technique of teaching of mathematics where as 7% female
g. 10% male teacher followed self-study as teaching technique of teaching mathematics where as 17% female
h. 7% male teacher followed brainstorming as teaching technique of teaching of mathematics where as 10% female.

Objective-4

a. 17% male teacher followed black board as teaching method of teaching mathematics where as 27% female

b. 24% male teacher followed textbook as a teaching learning material of teaching mathematics where as 27% female
c. 7% male teacher followed interactive model as a teaching learning material of teaching mathematics, where as 7% female
d. 10% male teacher followed calculator method as a teaching method of teaching mathematics, where as 7% female
e. 13% male teacher followed charts and picture as teaching learning material where as 7% female
f. 4% male teacher followed geometry box as teaching learning material where as 10% female
g. 11% male teacher followed computer as teaching learning material of teaching mathematics where as 13% female
h. 13% male teacher followed micro projector as teaching learning material where as 3% female

Objective-5

a. 24% male teacher followed performance assessment as a evaluation process of teaching mathematics, where as 27% female
b. 10% male teacher followed multiple Choice questions as evaluation process where as 7% female
c. 19% male teacher followed open response question as a evaluation process of teaching mathematics, where as 20% female
d. 19% male teacher followed short investigation as a evaluation process of teaching mathematics where as 20% female
e. 13% male teacher followed self-assessment as evaluation process of teaching mathematics where as 7% female
f. 16% male teacher followed portfolio as evaluation process of teaching mathematics where as 17% female

EDUCATIONAL IMPLICATION

1. Teacher uses problem solving method of teaching, which decrease students interest to gain more theoretical knowledge. If a teacher uses different teaching method like discovery method, pay-way method, inductive-deductive method, traditional method or project method, then the students use their understanding in practical way.
2. Teacher uses different type of teaching skill like questioning skill, explaining skill, class management skill to improve students strength according need of the class.
3. Teacher uses different types of teaching learning martial like interactive models, chart and picture, geometry box, blackboard in teaching mathematics in school to make effective classroom.
4. Teacher uses different type of teaching technique in the class for students can understand easily and improve the cooperation among them.
5. Teacher uses different types of evaluation process to find out the weakness of the students and to solve their weakness.

CONCLUSION

Mathematics is an important part of our curriculum. Mathematics plays key role of all science, art and reflect to our daily life. It plays an important role to develop a child's future. So, the researcher chooses the statement "Teaching of mathematics at higher secondary level of Malda district" that help the teacher for effective teaching learning process. This will help the teacher in improving the teaching method,

teaching technique, teaching skill etc. This will make mathematics interesting and participate students in learning mathematics.

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