DEVELOPMENT OF MATHEMATICS INTEREST ENHANCEMENT PROGRAMME FOR STUDENT TEACHERS AND STUDY ITS EFFECTIVENESS

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Abstract

Mathematics has played a significant role in building our civilization. Education Commission (1964-66), National Policy on Education (1986) has underlined the importance of Mathematics Education. Therefore, Mathematics is a compulsory subject at school level. If the students take interest in this subject then they can achieve better in Mathematics. But the fact is that there is more failure of students in Mathematics.

The Mathematics student teachers from the colleges of Education are tomorrow’s Mathematics teachers. They have to develop and enhance Mathematics Interest of their students. If they have interest in Mathematics during their pre service training period, then it will be helpful to develop and enhance Mathematics Interest among their students. Keeping this view in mind, the researcher decided to test the student teachers’ Mathematics Interest. He also decided to develop Mathematics Interest Enhancement Programme and study its effectiveness.

The objectives of present study are to test the Mathematics Interest of Mathematics student teachers, to compare the Mathematics Interest of student teachers according to their gender and medium, to develop Mathematics Interest Enhancement Programme and to study the effectiveness of the Programme.

Survey method was used to test the Mathematics Interest of Mathematics student teachers and the Experimental Method is used to study.

The null hypotheses for this study are, there will be no significant difference in the Mathematics Interest of male and female student teachers, there will be no significant difference in the Mathematics Interest of student teachers from Marathi and English medium and there will be no significant difference in the Mathematics Interest of student teachers from control group and experimental group.

The population is the Mathematics student teachers from Colleges of Education. The sample for survey includes 200 Mathematics student teachers from five Colleges of Education, while the Experiment includes 100 student teachers from two Colleges of Education in Pune city.

Mathematics Interest Inventory, the researcher made tool will be used for the collection of data. The mean, standard deviation and t test are the statistical tools used for data collection.

The conclusions of this study are Mathematics Interest of student teachers is above average, Mathematics Interest of male and female student teachers is same, Mathematics Interest of English medium and Marathi medium student teachers is similar and The Mathematics Interest Enhancement Programme was effective.

Keywords: Mathematics Interest Enhancement Programme, Student Teachers
DEVELOPMENT OF MATHEMATICS INTEREST ENHANCEMENT PROGRAMME FOR STUDENT TEACHERS AND STUDY ITS EFFECTIVENESS

1. Introduction:

Mathematics has played a significant role in building our civilization. Education Commission (1964-66), National Policy on Education (1986) has underlined the importance of Mathematics Education. Therefore, Mathematics is a compulsory subject at school level. One of the major aims of teaching Mathematics is to create an enduring interest and faith in the subject. According to Tyron Edwards, to awaken the interest and kindle enthusiasm is the sure way to teach easy and successfully. Interest is the key factor in achieving success in any task we perform. It plays vital role in learning.

The proper foundation in Mathematics knowledge laid at school which depends on the interest of student in Mathematics. If the students take interest in this subject then they can achieve better in Mathematics. Mathematics plays a crucial role in the economic and social development of the country. It is the queen of all sciences and backbone of the civilization. Mathematics develops intellectual powers like logical thinking and reasoning. The knowledge of Mathematics is essential requirement to study the other sciences. It is a compulsory subject at school level. Mathematics is the subject which needs more interest to attain the required achievement. But the fact is that there is more failure of students in Mathematics at secondary level.

2. Need of the study:

Teachers play the vital role in the development of interest in Mathematics subject among their students during their teaching. Therefore they should have the profound interest in Mathematics. Pre-service training is the proper time to enhance the student teachers’ interest in Mathematics. The Mathematics student teachers from the colleges of Education are tomorrow’s Mathematics teachers. They have to develop and enhance Mathematics Interest of their students. If they have interest in Mathematics during their pre service training period, then it will be helpful to develop and enhance Mathematics Interest among their students. As the researcher is Teacher Educator, He decided to test the student teachers’ Mathematics Interest. He also decided to develop Mathematics Interest Enhancement Programme and study its effectiveness. Therefore this research work is intended to develop a Mathematics Interest Enhancement Programme and study its effectiveness.
3. Importance of the study:
   - This research work identifies the Mathematics interest level of the student teachers.
   - Mathematics interest Inventory is useful to test Mathematics Interest of student teachers.
   - It will also useful to identify the student teachers with high and less interest in Mathematics.
   - Mathematics Interest Enhancement Programme (MIEP) for student teachers is the product of this research.
   - This programme is useful in enhancing the Mathematics interest level of student teachers.

4. Statement of the Problem:
   To develop the Mathematics Interest Enhancement Programme for Student Teachers and Study Its Effectiveness

5. Operational Definitions of the important terms:
   i. Mathematics Interest: It is the liking of the students to learn mathematics content and participate in mathematics activities, which is indicated by example solving, studying and getting involved in mathematics activity as a leisure time pursuit.
   ii. Mathematics Interest Enhancement Programme: The set of activities helpful for increasing the interest of student teachers in Mathematics is the Mathematics Interest Enhancement Programme (MIEP). This MIEP includes the activities such as Lectures by Experts, Mathematics Teaching Aids Development Workshop, Mathematics Book Show, Mathematics Laboratory, Development, compilation of Biographies of Mathematicians, collection of online resources for teaching learning of Mathematics (Text, PPTs, YouTube etc.), Visit to Mathematics Laboratory and Mathematics Quiz.
   iii. Student Teachers: The students learning in the colleges of Education with Mathematics as one of their teaching method are called as Student Teachers.
   iv. Effectiveness: The comparison between the Mathematics interest level of student teachers before and after the treatment of Mathematics is the Mathematics Interest Enhancement Programme (MIEP) is the effectiveness.
6. Objectives of the Study:

   The objectives of present study are-
   1. To test the Mathematics Interest of Mathematics student teachers.
   2. To compare the Mathematics Interest of student teachers according to their gender and medium of instruction.
   3. To develop Mathematics Interest Enhancement Programme.
   4. To study the effectiveness of the Programme.

5. Assumptions:

   1. At secondary school level, Mathematics is the difficult subject to the student.
   2. Most of the Students do not have interest in Mathematics at secondary level.
   3. The majority of Mathematics Teachers’ also have least interest in Mathematics.
   4. Interest plays a vital role in the teaching and learning of mathematics content.
   5. Mathematics Interest can be enhanced through the Programme.

6. Hypotheses:

   Following research hypotheses and null hypotheses were decided for this study-

   **Research hypotheses**
   1. There will be difference in the Mathematics Interest of male and female student teachers.
   2. There will be difference in the Mathematics Interest of student teachers from Marathi and English medium.
   3. There will be difference in the Mathematics Interest of student teachers from control group and experimental group.

   **Null hypotheses**
   The null hypotheses for this study are,
   1. There will be no significant difference in the Mathematics Interest scores of male and female student teachers.
   2. There will be no significant difference in the Mathematics Interest scores of student teachers from Marathi and English medium.
   3. There will be no significant difference in the Mathematics Interest scores of student teachers from control group and experimental group.
7. Research methodology:

7.1 Method of the research: Multi methods of research were used for the present work, which includes Survey Method, Product Development Method and Experimental Method.

Survey Method: For measuring the Mathematics interest of student teachers survey Method was used.

Product Development Method: For the development of Mathematics Interest Enhancement Programme for the Student Teachers the product development method was used.

Experimental Method: For studying the effectiveness of the Mathematics Interest Enhancement Programme the Experimental method was used. Two equivalent group post test design was used for the experiment.

Variables: The Mathematics Interest Enhancement Programme for the Student Teachers is the Independent variable and Mathematics Interest is the Dependent variable for this research work.

7.2 Population and Sample

The population for this study was the Mathematics student teachers from Colleges of Education in Maharashtra.

The sample for survey includes 200 Mathematics student teachers from five different Colleges of Education in Pune city. These colleges were selected by random method of sampling while the student teachers were selected by purposive method of sampling.

For Experimental Method a purposive sampling method was used in which 100 student teachers (50 in Control Group and 50 in Experimental Group) were selected from two Colleges of Education in Pune city.

7.3 Tool for data collection

The tool used for data collection was Mathematics Interest Inventory (MII). This inventory was developed by the researcher in English and Marathi Language.

7.4 Statistical Techniques

The Mean, standard deviation and t test were the statistical tools used for data collection.
8. **Scope Limitations and Delimitation:**

**Scope:** The geographical scope of the present study is Pune city. The conclusions of the present research study will be applicable to Student teachers from English medium and Marathi medium Colleges of Education in Maharashtra.

**Limitations:** The conclusions of this research study are based on the responses given by student teachers to Mathematics Interest Inventory and Mathematics Interest Enhancement Programme.

**Delimitations**

i. The present research study is delimited to the Mathematics Interest the student teachers.

ii. Mathematics Interest Enhancement Programme is developed by the researcher.

iii. Mathematics Interest Inventory is also developed by the researcher.

iv. The sample is selected from Pune city only.

9. **Procedure of the Study**

- **A survey:** To test the Mathematics Interest of student teachers, the researcher conducted a survey of 200 teachers from five different colleges of Education in Pune city.

- **Development of Mathematics Interest Enhancement Programme:** To enhance the Mathematics Interest of the student teachers the Programme was developed by the researcher.

- **Experiment:** To study the effectiveness of Mathematics Interest Enhancement Programme, researcher conducted experiment. In that experiment, two equivalent group post test design was used.

  First the Mathematics Interest Inventory was administered on the larger sample. Then the treatment in the form of Mathematics Interest Enhancement Programme was given to Experimental group and Mathematics Interest Inventory was administered both Control group and Experimental group to study the effectiveness of the Programme.
**Interpretation of Mathematics Interest Inventory Scores**

The scores obtained with the help of the Mathematics Interest Inventory are interpreted as given in the following table.

**Table No.1**

Interpretation of Scores: Mathematics Interest Inventory

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Raw Scores</th>
<th>Mathematics Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>41 and above</td>
<td>Very High</td>
</tr>
<tr>
<td>2.</td>
<td>33 - 40</td>
<td>High</td>
</tr>
<tr>
<td>3.</td>
<td>25 - 32</td>
<td>Above Average</td>
</tr>
<tr>
<td>4.</td>
<td>17- 24</td>
<td>Average</td>
</tr>
<tr>
<td>5.</td>
<td>9 - 16</td>
<td>Low</td>
</tr>
<tr>
<td>6.</td>
<td>8 and below</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

**10. Data Analysis and Interpretation**

**10.1 Mathematics Interest of Student Teachers**

Mathematics Interest Inventory was administered to the 200 teachers from five colleges of Education in Pune city. The Mean, Standard Deviation of the Mathematics Interest Inventory scores were calculated, similarly the means and Standard Deviation according to their gender and medium of instruction were calculated.

**Table No.2**

Mean, Standard Deviation of the Mathematics Interest Inventory scores

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Student Teachers</th>
<th>Numbers (N)</th>
<th>Mathematics Interest score</th>
<th>Nature of Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean (M)</td>
<td>S.D.</td>
</tr>
<tr>
<td>1.</td>
<td>All</td>
<td>200</td>
<td>31.20</td>
<td>8.356</td>
</tr>
<tr>
<td>2.</td>
<td>Male</td>
<td>76</td>
<td>31.10</td>
<td>8.113</td>
</tr>
<tr>
<td>3.</td>
<td>Female</td>
<td>124</td>
<td>31.50</td>
<td>8.082</td>
</tr>
<tr>
<td>4.</td>
<td>English Medium</td>
<td>106</td>
<td>31.30</td>
<td>8.444</td>
</tr>
<tr>
<td>5.</td>
<td>Marathi Medium</td>
<td>94</td>
<td>31.40</td>
<td>7.685</td>
</tr>
</tbody>
</table>

From the Table No.2, the Mathematics Interest of all teachers is **above average**. The Mathematics Interest of male and female teachers is **above average**. The Mathematics Interest of English medium and Marathi medium student teachers is also **above average**.
10.2 Hypothesis testing

The researcher had decided to compare the Mathematics Interest of male and female Student Teachers and English medium and Marathi medium Student Teachers. He had also decided to study the effectiveness of the Mathematics Interest Enhancement Programme for Student Teachers accordingly three null hypotheses were stated.

- **Testing the hypothesis No. 1**

  The null hypotheses No.1 was, there will be no significant difference in the Mathematics Interest scores of male and female student teachers. This hypothesis was tested by calculating means, standard deviation and t- value. The means, standard deviation and t-values are given in the table.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Student Teachers</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>t-value calculated</th>
<th>Null Hypothesis*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>76</td>
<td>31.10</td>
<td>8.113</td>
<td>0.730</td>
<td>Accepted</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>124</td>
<td>31.50</td>
<td>8.082</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* t- value from table at 0.05 level is 1.98

From the Table No. 3, it can be seen that the difference in the Mathematics Interest of the male and female student teachers is not significant therefore, the null hypothesis No.1 was accepted. Thus the Mathematics Interest of male and female student teachers is same.

- **Testing the hypothesis No. 2**

  The null hypotheses No.2 was, there will be no significant difference in the Mathematics Interest scores of student teachers from Marathi and English medium. This hypothesis was tested by calculating means, standard deviation and t- value. The means, standard deviation and t-values are given in the table.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Student Teachers</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>t-value calculated</th>
<th>Null Hypothesis*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>English medium</td>
<td>106</td>
<td>31.30</td>
<td>8.444</td>
<td>0.461</td>
<td>Accepted</td>
</tr>
<tr>
<td>2</td>
<td>Marathi medium</td>
<td>94</td>
<td>31.40</td>
<td>7.685</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* t- value from Table at 0.05 level is 1.98

From the Table No. 4, it can be seen that the difference in the Mathematics Interest of the English medium and Marathi medium student teachers is not significant therefore, the null hypothesis No.2 was also accepted. Thus the Mathematics Interest of the English medium and Marathi medium student teachers is similar.
Testing the hypothesis No. 3

The null hypotheses No.4 was, there will be no significant difference in the Mathematics Interest scores of student teachers from control group and experimental group. This hypothesis was tested by calculating means, standard deviation and t-value. The means, standard deviation and t-values are given in the table.

Table No. 5
Mean Standard deviation and t-value of Mathematics Interest

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Test</th>
<th>N</th>
<th>Mean</th>
<th>Mathematics Interest</th>
<th>S.D.</th>
<th>t-value calculated</th>
<th>Null Hypothesis*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control Group</td>
<td>50</td>
<td>31.66</td>
<td>Above average</td>
<td>7.865</td>
<td>3.367</td>
<td>Rejected</td>
</tr>
<tr>
<td>2</td>
<td>Experimental Group</td>
<td>50</td>
<td>38.40</td>
<td>High</td>
<td>5.624</td>
<td>3.367</td>
<td></td>
</tr>
</tbody>
</table>

* t-value from Table at 0.05 level is 1.96

From the Table No. 5, it can be seen that the difference in the means of Mathematics Interest of student teachers from Control Group and Experimental Group is significant therefore, the null hypothesis No.3 was rejected. Thus the Mathematics Interest Enhancement Programme for Student Teachers is effective.

11. Conclusions:
1. Mathematics Interest of student teachers is above average.
2. Mathematics Interest of male and female student teachers is same.
3. Mathematics Interest of English and Marathi medium student teachers is similar.
4. The Mathematics Interest Enhancement Programme was effective.

12. Contributions to the Field of Education:
This research work will play the contributory role for the incorporation of Mathematics Interest Enhancement Programme in the Pre-service and in-service training programme for the teachers.

Present study will enhance the Mathematics Interest of Pre-service teacher community which will be helpful for future generation.

13. Recommendations:
The following recommendations made based on the conclusions and observations made by the researcher.

- Mathematics Interest of student teachers should be tested.
- Mathematics Interest of in-service teachers should be tested.
- Mathematics Interest Enhancement Programme should be incorporated in the pre-service and in-service training programme of the teachers.
11. Mouley, G.J. ()1964 *The Science of educational research*, New Delhi, Eurasis Publishing House,

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