Development of Self-Learning Instructional Material and its Effecto on Academic Achievement in Mathematics of Class Eight Students

Priyanka Mittal
Assistant Professor, Regional Institute of Education, Ajmer, Rajasthan-305004
Email: priyanshimittal1984@gmail.com

Abstract- *Introduction-Mathematics is an important subject in the school curriculum. It is more closely related to our daily life as compared to other subjects. Except for our mother tongue, there is no other subject which is more closely related to our daily life as mathematics. According to National Policy on Education (1986) "Mathematics should be visualized as the vehicle to train a child to think, reason, analyze and articulate logically."*

Objectives-The objectives of the study are: 1. To develop self-learning instructional material of mathematics for class eight students. 2. To find out the effect of the developed self-learning instructional material of mathematics on academic achievement in mathematics of class eight students.

Method and Procedure-The researcher used the developmental method followed by the experimental method. So the research design consisted of two phases, viz., Developmental phase and Experimental phase. The selection of the school was kept purposive because only co-education school having two sections could meet the researcher's experimental needs. Self-Made Rating Scale: For Validation of Self Learning instructional material (SLIM) in mathematics and Academic achievement test (Post-test) of mathematics used by the researcher.

Result and Discussion- Finally, concluded that significant effect of self-learning instructional material was found on academic achievement in mathematics of class eight students.

Conclusion- The main finding of the study was that there was a significant effect of the teaching based on self-learning instructional material. It was found that the students who were exposed to the self- learning instructional material performed significantly better in mathematics than the students who were taught by conventional method. It is due to the development of mental faculties of the students by reasoning, logical thinking, self-motivation (applications of self-learning instructional material).

Implication- Studying mathematics by using Self-learning instructional material will help the students to learn mathematics in a systematic way further it will help the students to learn with their own capacity and their own speed.

Introduction

Mathematics is an important subject in the school curriculum. It is more closely related to our daily life as compared to other subjects. Except our mother tongue there is no other subject which is more closely related to our daily life as mathematics. According to National Policy on Education (1986) "Mathematics should be visualized as the vehicle to train a child to think, reason, analyze and articulate logically."

Roger Bacon has well said, "Mathematics is the gateway and key of all sciences". Science and technology cannot stand without mathematics. Therefore, mathematics should be utilized correctly in the realization of goals for national benefits for science and technology and the people in general. (Tactic et.al., 2008). In the words of Physicist Richard Feynman, "Nature talks to us in the language of mathematics, which includes numbers, mathematical rules and equations which help us to make sense of the world around us." It will not be an exaggeration to say that for a nation to progress and advance in various fields such as science and technology, knowledge of mathematics is the foremost condition.

Realizing the importance of mathematics for individual, societal and national development Kothari Commission (1964-1966) suggested that, "Science and mathematics should be taught on a compulsory basis to all the pupils as a part of general education during the first ten years of schooling". This is expected to develop arithmetic, logical and analytic competence leading to all-round personality enrichment of students, but, it is sad to observe that in general, students face the problem of mathematical phobia due to their failure in understanding the concepts of mathematics. This mathematical phobia in students can be attributed to a number of causes which are as follows-

- Incomplete mastery of number facts.
- Computational weakness.
- Difficulty in transferring knowledge.
- Difficulty in making connections of one aspect of mathematics with another.
- Incomplete understanding of the language of mathematics. (Nathan V., 2002)

Thus, it can be said that although mathematics holds an important position not only in the school curriculum but also in the life of students, still it is neither taught nor studied with the kind of enthusiasm and interest it deserves. A number of reasons can be given for this grim scenario and there is a dire need to explore possibilities for making mathematics teaching-learning an appealing enterprise for students and teachers.

The **National Council for Teachers of Mathematics** (NCTM) recommends instructional tactics that promote conceptual understanding of mathematics concepts and useful skill development. In a comprehensive review of significant studies that address efficacy in

instructional practice, the NCTM reported in 2005 that effective instruction may be expository or discovery, teacher-centered or student-centered. The important feature of effective instruction is found in how well the learning activity attends "explicitly to important mathematical relationships." To promote conceptual understanding, students need to assess a situation independently and apply the correct mathematical formula to solve problems beyond the classroom. Students should be permitted to struggle with challenging, non-specific problems and to discover different paths for viewing and solving a problem—in this way, they will become persistent math students. Researchers have attempted earlier to develop self-learning instructional material by assuming the following differences between books and that material.

Table 1.1: Differences between Books and Self-Learning Instructional Material

Textbooks		**Self-learning instructional material (SLIM)**
1	Assume interest	Arouse interest
2	Written mainly for teacher use	Written primarily for Learner use
3	Designed for a wider market	Designed for a particular learner group
4	Little or no self-motivation	Emphasis on self-motivation
5	Structured for teachers and specialists	Structured according to the need of learners
6	Little or no self-assessment	Major emphasis on self-assessment

Therefore, the researcher attempted to develop the material having the above properties assuming that these will help in reducing the problems of teaching-learning process and help students to improve their academic achievement in mathematics.

Emergence and Justification of the Problem

Low achievers are found at every level of education. Low achievers in mathematics do not process problem, information effectively or efficiently. They lack or do not apply the resource needed to complete this complex cognitive activity. Generally, students also have lack of self-regulation strategies that helps the students to understand, analyze, solve and evaluate problem successfully. Due to the low achievement in mathematics, fear, phobia, anxiety, fatigue, frustration get developed in the students and throughout their whole life they try to escape from mathematics which may further result in stress, fatigue, depression and even suicidal tendencies (Kabura, 2007).

It is well known that the present status of achievement in mathematics in our upper primary system is depressing. Students try to run away from mathematics and are even unable to interpret and apply mathematical concepts in their daily life. Students have been found to face a lot of problems in mathematics such as absence of number sense, problem of visual, spatial, language problem, lack of concentration, poor confidence level and unmotivated attitude towards

mathematics (Conte, 1991; Zentall and Zentall, 1983). Research shows that remedial teaching based on diagnostic tests followed by some intervention programs can improve students' performance in mathematics (Baroody and Hume, 1991; Bos, and Vaughn, 1994; Shalev and Gross-Tsur, 2001; Temple and Sherwood, 2002).

Although in some schools many activities are conducted with the usage of lab-manuals, smart classes, practical's in mathematics but improvement in mathematics achievement is not satisfactory because it is found that majority of the Indian schools do not have resource room facility or special educators available for mathematics teaching. Moreover, formal education system has pre-decided overloaded syllabus to be covered in limited available time. It forces to avoid the use of activity-based type of instructional techniques by teachers (Bos and Vaughn, 1994). The survey conducted by Bos and Vaughn in 1994 also revealed that the heterogeneous makeup of the classes and the large number of students that teachers had to teach made it difficult for the mathematics teachers to enrich the instructional procedure.

This type of present scenario of mathematics teaching-learning reflects that there is a need for rearranging the content of mathematics in a learner-friendly way. National Mathematics Advisory Panel Report (2008) has also recommended self–instruction as one of the successful mathematical teaching strategy.

Furthermore, Mathematical educators have adopted the theory of self-regulated learning as an important change that has emerged during the last two decades of the century; they expect students to assume control and agency over their own learning and problem-solving abilities (De Corte, Verschaffel and Op't Eynde, 2000). Self-learning material is also expected to play an important role in enhancing the self-regulated learning habits in the students.

The above discussion reflects the need for developing self-learning material which is expected to help students in improving academic achievement in mathematics by increasing their self- confidence and interest in mathematics.

Definition of the Terms Used in the Study

Self-learning instructional material

According to Ashish K. Awadhiya, Asst. Director, IGNOU (2012), Self-learning instructional material includes all the study material developed to stimulate independent learning. Espich and Williams has reported in an article on ict 3 year (2012) that Self-learning instructional material is a planned sequence of experiences, leading to proficiency, in terms of stimulus responses relationship that have proven to be effective.

Hemant LataSharma, **directorate of distance education, Maharshi Dayanand Universi ty, Rohtak, India** in a Journal of distance Education (2002) has also written that Self-learning instructional material is a learner-oriented instructional material in which learning takes place without requiring the physical presence of teachers.

Operational Definition

In this study, self-learning instructional material indicates such learning material (in printed form) which can help in enabling students to analyze the problem, develop the strategy which is to be used to solve the problem, to implement that strategy to solve the problem, to analyze the result and to develop the habit of self-evaluation and self-motivation with minimum guidance of teacher.

Academic Achievement

According to Dictionary of Education (1978), Academic Achievement refers to knowledge attained or skills developed in school subjects usually designated by the scores or by the marks assigned by the teacher. Further Kuppaswamy (1974) has said that Academic achievement is the level of performance of students in different subjects in the academic examination.

Operational definition

In this study, the term academic achievement involves performance of students in mathematics as indicated by their scores.

Objectives

The major objectives for the present study are:

- To develop self-learning instructional material of mathematics for class eight students.
- To find out the effect of the developed self-learning instructional material of mathematics on academic achievement in mathematics of class eight students.

Hypothesis

The null hypothesis and alternative hypothesis related to the experimental phase of the study are stated below:

- H_o = "There is no significant effect of self-learning instructional material on academic achievement in mathematics of class eight students."
- H_a = "There is a positive effect of self-learning instructional material on academic achievement in mathematics of class eight students."

Delimitations of the Problem

- The researcher studied the effect of self-learning instructional material (SLIM) only in the subject of mathematics.
- Only class eight students of two sections of the selected school were taken into account for the study.
- Self-learning instructional material (SLIM) was developed by the researcher for the limited content selected by need analysis.

Variables

Independent Variable: Self-learning instructional material.

Dependent Variable: Academic achievement

Controlled Variables: Age, syllabus, topic taught. Age of the students taken by the researcher was 13-15 years. The same content was taught in both the section during the experiment, furthermore, topics taught each day were also same for both the groups.

Design of the Study

Method

The researcher used a developmental method followed by the experimental method. So the research design consisted two phases, viz., **Developmental phase** and **Experimental phase**.

Developmental Phase

According to **the** Education Resource Information Center (2010), Developmental research is the study of developing, designing and then evaluating instructional processes, programmes and products. Developmental method consists of the following steps:

1. **Need analysis**
   Before developing the self-learning instructional material on mathematics, "it is necessary to determine the need for that instructional material in terms of what problem within the organization (mathematics teaching system) will be solved through the use of new skills; or what opportunity can be seized because of new skills in the organization. This step is critically important to the success of the design process." (C. F. Kaufman, 1991 and Rosette, 1999). In the present study this step was devoted to exploring and analyzing the difficulties faced by mathematics students and teachers in math teaching. This step also enabled the investigator to discover the hard spots in mathematics and also the shortcomings of the present mathematics curriculum, which need to be removed. It provided an overview of the resources available and the constraints faced by the target groups. For this, the views of various concerned groups' viz. students and mathematics teachers taken through interviews and Rating Scale concerned with the difficulty level of each topic of mathematics of class eight were also administered by the researcher.
2. **Specification of objectives**
   Based on the need analysis, the instructional objectives of the self-learning instructional material in mathematics and pedagogy for student of class eight was formulated in specific terms.
3. **Defining the mechanism for the evaluation of the achievement of goals**
   Techniques were planned for evaluating the progress of the students with respect to their academic excellence in mathematics.
4. **Selection and organization of content (subject matter)**

On the basis of the objectives, sample content was selected. Thereafter, the content was organized and sequenced appropriately. For this, the prescribed text-books of mathematics for class eight of various authors were be analyzed.

5. **Selection/ Development of appropriate pedagogy**
   Pedagogy was decided based on the nature and objectives of content, students` interests and other practical considerations such as available resources, facilities, equipment, time, etc. Due emphasis was given to student-centered methods such as inquiry-based teaching-learning, heuristic method, problem-solving method, brainstorming etc.
6. **Developing self-learning instructional material**
   The selected content and pedagogy were designed in the form of topic-wise integrated self -learning material for teaching and learning of mathematics.
7. **Validation through the experts' opinion**
   Experts' opinion was taken for validating the prepared self-learning material and pedagogy. The researcher used a rating scale to rate the characteristics (assumed by the researcher) of the developed material. Modifications were done in direction of those characteristics which were less agreed by the experts on the basis of their suggestions to develop the self-learning instructional material.
8. **Try out on a small group**
   The researcher administered the validated SLIM on the group of 4 students and further improved it by making changes according to the difficulties reported by the children. In this way final draft of SLIM was developed by the researcher.

After following these entire steps researcher developed the self-learning instructional material and figural representation of these steps of development is also represented in fig.1.1.

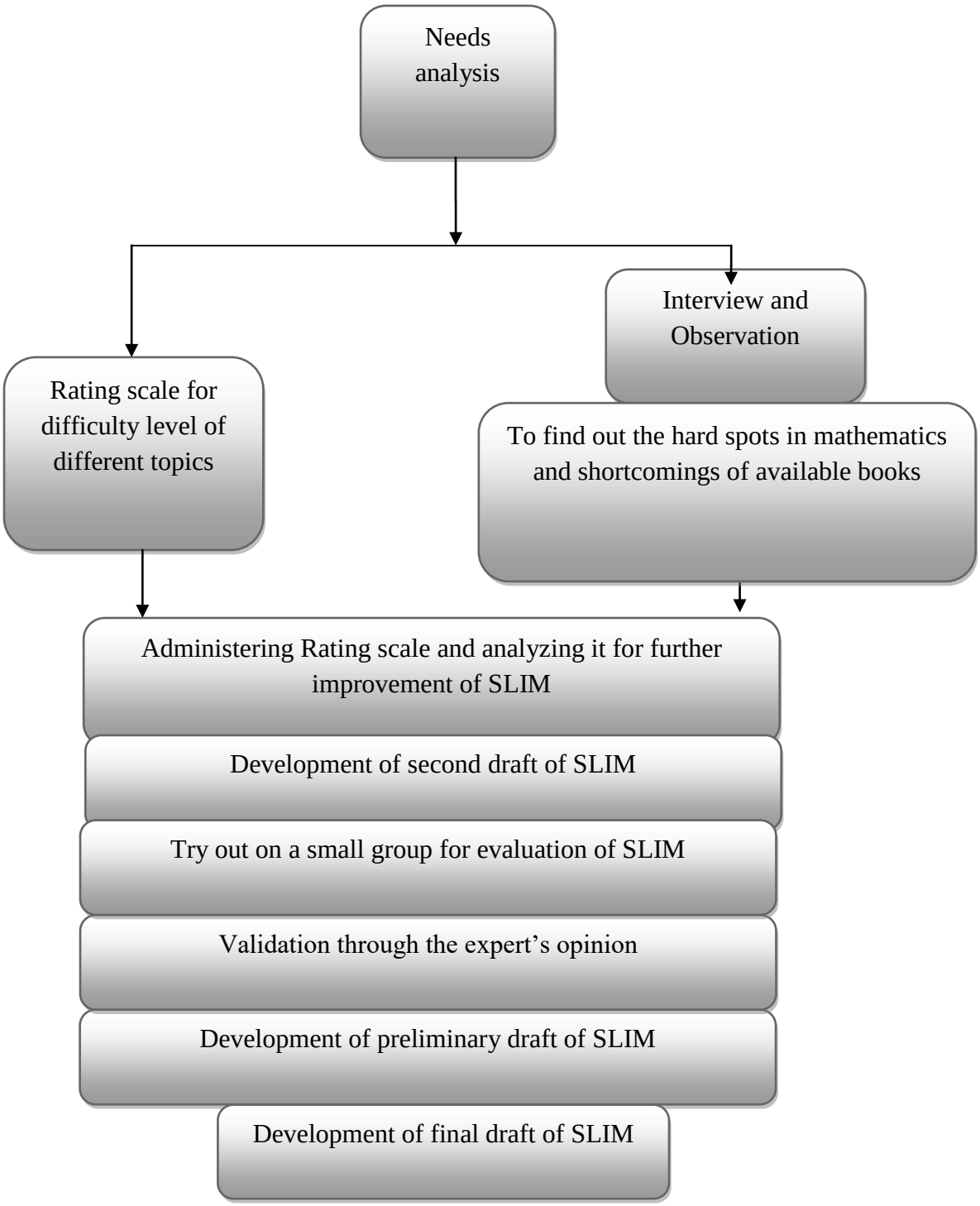

Fig 1: Developmental Phase of the Study

Experimental Phase

According to Jennifer Dick, "Experimental research method is a method to test a hypothesis by controlling the factors of the experiment to determine or predict an outcome based on independent and dependent variable."

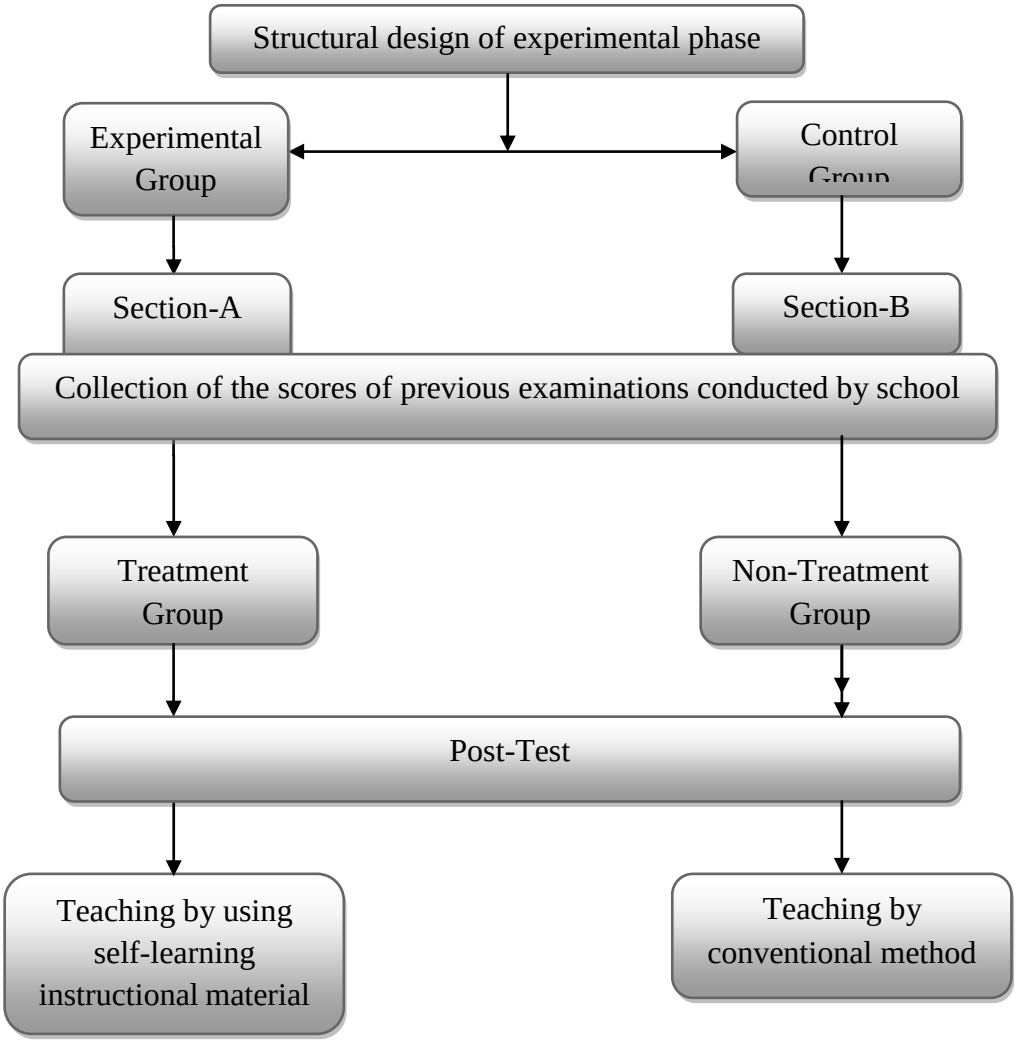

Fig 2: Experimental Phase of the Study

In the experimental phase pre-test was not administered by the researcher to know the intelligence level of the students but the researcher used students' previous examination scores to prevent the effect of pre test on post test. Groups (Experimental and control groups) equivalency was checked by the researcher on the basis of the students' previous scores.

Sample of the Study Sample is defined as "A part of a population, which for the purpose in hand is taken as representative of the whole population, so that certain conclusion based on the sample will be valid for this whole population." Dictionary of Psychological terms, -English and English (1980)

According to *J. P. Guilford* (1978), a *purposive sample* is one arbitrary selected because there is good evidence that it is very representative of the total population. The selection of the class was kept purposive because class eight is the last stage of the bridge which connects the basic mathematics with the higher one (in secondary level). This is the stage where it is necessary to develop all basic skills related to mathematics to understand mathematics at the secondary level and higher level which is more abstract and logical.

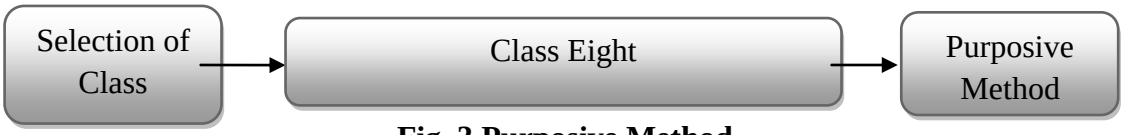

Fig. 3 Purposive Method

The selection of the school was kept purposive because only co-education school having two sections could meet the researcher's experimental needs.

Procedure of the Study

The researcher adopted the following steps in the procedure for the present study.

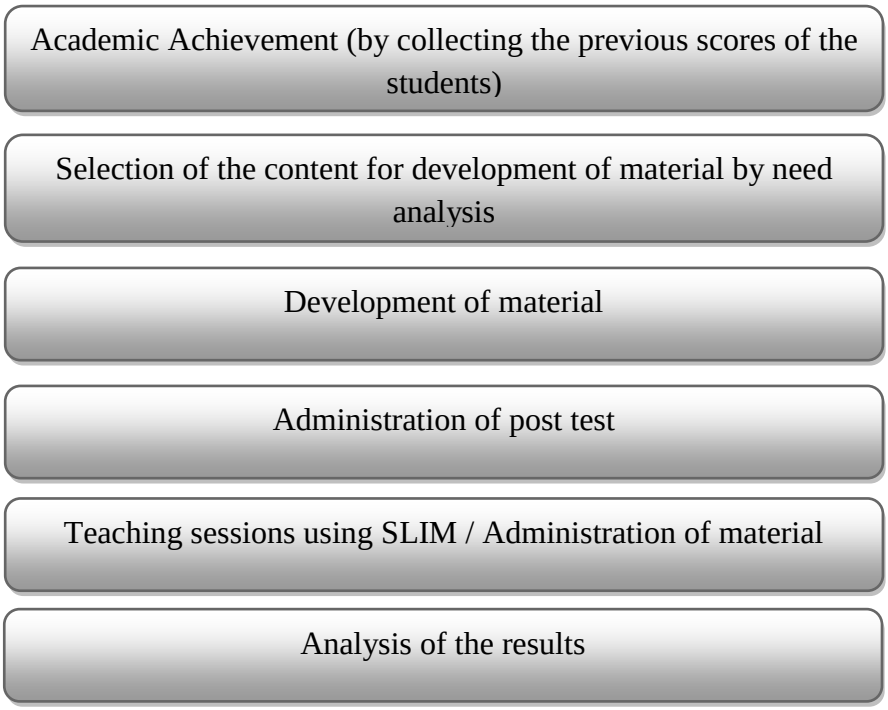

Fig 4: Procedural Steps of the Study

Tools

Self-made tools were used by the researcher. Following tools and techniques were developed and used by the researcher for achieving the objectives of the present study:

- Rating Scale: Need Analysis for teaching of mathematics (Difficulty level scale).
- Interview and observation (Conducted by the researcher).
- Self-learning instructional material.
- Rating Scale: For Validation of Self Learning instructional material (SLIM) in mathematics.
- Academic achievement test (Post-test) of mathematics.

Statistical Techniques

To achieve the objectives of the study the researcher employed the following statistical techniques.

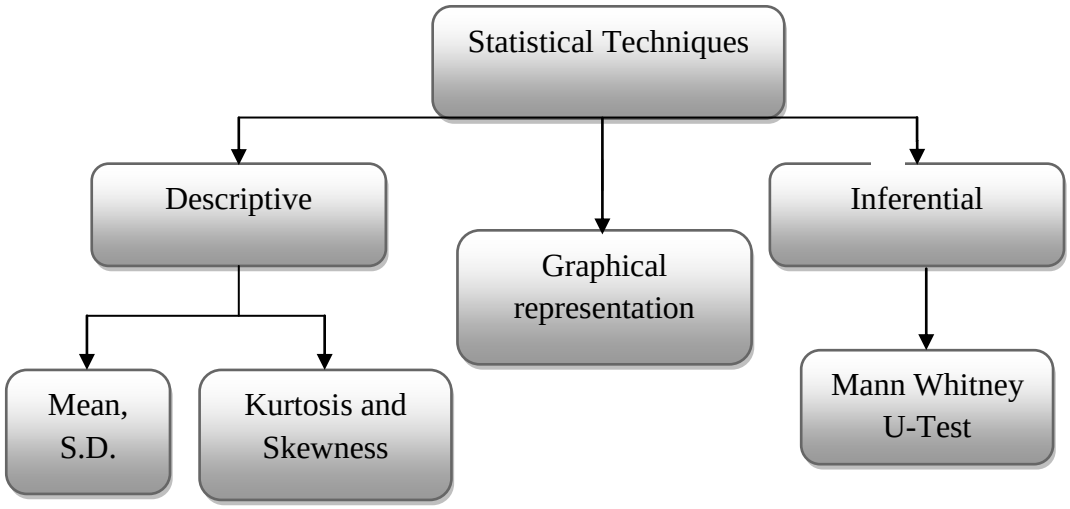

Fig 5: Statistical Techniques of the Study

Statistical methods are extensively used in educational research. They provide an indispensable tool for collecting, organizing, analyzing and interpreting data expressed in numerical terms. By synthesizing the data, these methods can facilitate the derivation of conclusions and formulation of generalizations.

Descriptive Statistics

Descriptive techniques are used to describe the sample or group used by the researcher. The researcher used mean to find out the average academic achievement of control and experimental group before and after teaching sessions (through SLIM in experimental group and by conventional method in control group). S.D. is used by the researcher to know the spreads of the scores of academic achievement from mean. The researcher also used skewness and kurtosis to find out the nature of the data.

Inferential Statistics
These are concerned with

- Estimation of population parameters
- Testing of hypothesis

The researcher used Mann Whitney U-test to compare academic achievement of the control and experimental group before and after the teaching sessions (through SLIM in experimental group and by conventional method in control group) and Mann Whitney U-test is used to test the hypothesis also.

Graphical Representation
Graphical representation often facilitates understanding of a set of data. If the graph is well-drawn, it is usually easier to read and interpret data. Researcher used bar graph and smoothed frequency curve for graphical representation. The researcher used bar graph to give the graphical representation of mean scores of students in mathematics before and after the teaching sessions (through SLIM in experimental group and by conventional method in control group) of both the groups (Control and experimental groups).

Researcher used smoothed frequency curve to give the graphical representation of students academic achievement in mathematics before and after the teaching sessions (through SLIM in experimental group and by conventional method in control group) of both the groups (Control and experimental groups) and to know the nature of collected data of both the groups.

Findings of the study
The major objectives of the present investigation were:

- To develop self-learning instructional material of mathematics for class eight students
- To find out the effect of the developed self-learning instructional material of mathematics on academic achievement in mathematics of class eight students.

Objective wise findings of the study are as follow:

To develop self-learning instructional material of mathematics for class eight students
Development of self-learning instructional material includes the following steps:

- **Need Analysis**
  The researcher developed a rating scale to find out the most difficult topics in mathematics of class eight. Researcher found mean value of difficulty level for each topic with the help of collected data on the difficulty level scale most difficult topic was factorization which has 3.60 difficulty level on 5-point scale, second most difficult (3.40 difficulty level) topic was operations on algebraic expressions and third most difficult (3.30 difficulty level) topic was linear equations. Area of trapezium and polygon, construction of quadrilateral and parallelograms also come in picture. After getting these

results researcher analyzed that most of the students feel difficulty in topics related to algebra and decided to prepare the SLIM in algebra.

- **Specification of objectives**
  Based on the need analysis, the instructional objectives of the self-learning instructional material in mathematics and pedagogy for student of class eight was formulated in specific terms.
- **Defining the mechanism for the evaluation of the achievement of goals**
  Techniques were planned for evaluating the progress of the students with respect to their academic excellence in mathematics.
- **Selection and organization of content (subject matter)**
  On the basis of the objectives, sample content was selected. Thereafter, the content organized and sequenced appropriately. For this, the prescribed text-books of mathematics for class eight of various authors were analyzed.
- **Selection/ Development of appropriate pedagogy**
  Pedagogy decided based on the nature and objectives of content, students' interests and other practical considerations such as available resources, facilities, equipment, time, etc. Due emphasis is given to student-centered methods such as inquiry-based teaching-learning, heuristic method, problem-solving method, brainstorming etc.
- **Developing self-learning instructional material**
  The selected content and pedagogy designed in the form of topic-wise integrated resource material for teaching and learning of mathematics.
- **Validation through the experts' opinion**
  Experts' opinion was taken for validating the prepared resource material and pedagogy. The researcher used a rating scale to rate the characteristics (assumed by the researcher) of the developed material. Modifications were done in direction of those characteristics which less agreed by the experts on the basis of their suggestions to develop the self-learning instructional material. All the experts agreed to the characteristics such as It can be used at any time, Helpful in self-evaluation, It is according to the curriculum of class eight, It can be used at any place, It will provide facility of self-paced learning, but only three experts out of six agreed with the characteristics: Concepts are well explained in it, it can be understood by the learner and It is self- explanatory. Similarly, for other characteristics researcher found that 5 and 4 experts were agreed. By this researcher analyzed that improvement regarding those characteristics is required which are less agreed by the experts.

Suggestions for improvement

Experts gave the following suggestions to increase the validity of SLIM.

- Explanation must be in more detail.
- Pictures should be provided to make it more interesting
- Objectives should be written at the beginning of the material.

- Section-wise information should be provided in the beginning.

According to these suggestions, researcher improved the material to validate it. In this way validity of SLIM became high and as highly valid tool automatically becomes reliable therefore SLIM becomes reliable too.

- **Try out on a small group**
  The researcher administered the validated SLIM on the group of 4 students and further improved it by making changes according to the difficulties reported by the children. In this way final draft of SLIM developed by the researcher.

After following all these steps researcher developed the self-learning instructional material.

To find out the effect of the developed self-learning instructional material of mathematics on academic achievement in mathematics of class eight students.

To analyze the effect of self-learning instructional material researcher studied academic achievement of both the groups, did intragroup and inter groups' comparison of academic achievement before and after treatment and finally checked the effectiveness of self-learning instructional material on academic achievement.

- **Academic achievement of learners before implementation of self-learning instructional material on experimental group and conventional teaching in control group**
  The mean of the experimental and controlled group were found to be 66.78 and 65.76 respectively which indicate the average academic performance of the groups. Values of the S.D. in experimental and controlled groups were found to be 15.67 and 18.18 respectively which indicate the average deviation of the scores from their corresponding means. It further indicates that large number of students' score is near the mean score as compared to controlled group. The value of skewness of experimental and controlled group is found to be -0.6464 and -.3424 respectively, which shows that both the groups have negative skewness. Furthermore, it can be said that in both the groups more number of students scored above average. The value of kurtosis of experimental and controlled groups was found out to be 0.2229 and 0.2016 respectively, which is less than 0.263. Thus the curves were leptokurtic indicating homogeneity of the groups.
- **Comparison of pre-test scores of experimental and controlled group**
  The difference in the means of groups in the pre-test was 1.02, which depicts the very low difference between the mean values of pre-test scores of the controlled group and experimental group. The researcher applied Mann Whitney U-test to check that the difference between both the group is significant or not and obtained U value was 251. As N was greater than 20, therefore, the calculated U was converted into Z-scores and calculated Z value was 0.0454 which is very less than 1.96 (the tabulated Z value at 0.05 level of significance), it indicates the insignificant difference between academic

achievements in pre-test of both the groups. Therefore, it can be concluded that no significant difference was found in the pre-test scores of the experimental and control groups. Hence, the groups were considered to be equivalent.

- **Comparison of the pre-test and post-test scores of the control group**
  Calculated Z value was 0.0586 which is very less than 1.96 (the tabulated Z value at 0.05 level of significance) and it indicates the insignificant difference at 0.05 level of significance between the pre-test scores and the post-test scores of the controlled group.
- **Comparison of the pre-test and the post-test scores of experimental group**
  Calculated Z value was 2.2408 which is greater than 1.96 (the tabulated Z value at 0.05 level of significance) and it indicates the significant difference at 0.05 level of significance between the pre-test scores and the post-test scores of the experimental group. It can be concluded that there was little gain in the academic scores of the students of the experimental group, which were taught by using SLIM (self-learning instructional material).

- **Effect of self-learning instructional material on academic achievement**
  The difference in the means of groups in post-test was 11.03, which depicts the remarkable difference between the mean values of post-test scores of the controlled group and experimental group. Standard Deviation of the experimental group was 13.27 that was lower than control group (S.D = 18.73). It shows that variability among the scores obtained by students of experimental group got reduced. Furthermore, it also reflects that as compared to the control group, more students scored high in academic achievement. Researcher applied Mann Whitney U-test to check that the difference between both the group is significant or not and calculated Z value was 2.0776 which is greater than 1.96 (the tabulated Z value at 0.05 level of significance), it indicates the significant difference between academic achievements in post-test of both the groups. This reflects that there was a little gain in the academic scores of the students of the experimental group, who were taught using SLIM (self-learning instructional material). Hence significant effect of self-learning instructional material was found on academic achievement in mathematics of class eight students.

Testing of Null hypothesis

Null hypothesis formulated by the researcher was: '*There will be no significant effect of self-learning instructional material on academic achievement in mathematics of class eight students'.* To test the null hypothesis researcher calculated the Z value from the obtained value of U and the calculated Z-value was 2.0776 which was greater than 1.96 (tabular value of Z at 0.05 level of significance) but lesser than 2.58 (tabular value of Z at 0.01 level of significance). Therefore, the null hypothesis was rejected at 0.05 level of significance and automatically alternative hypothesis i.e. '*There will be positive effect of self-learning instructional material on academic achievement in mathematics of class eight students'* was accepted.

Conclusion of the study

To fulfill the objectives of the study and to test the hypothesis, the researcher has applied mean, S.D., Skewness, Kurtosis for the description of the data and used Mann-Whitney U-test for finding the effect of self-learning instructional material on academic achievement. The main finding of the study was that there was significant effect of the teaching based on self-learning instructional material. It was found that the students who were exposed to the self-learning instructional material performed significantly better in mathematics than the students who were taught by conventional method. It is due to the development of mental faculties of the students by reasoning, logical thinking, self-motivation (applications of self-learning instructional material). Following are the studies which support the findings of the researcher.

Robert Cobb, Jr. (2003) has found **a** positive correlation between self-regulated learning and academic achievement in his study, *the relationship between self-regulated learning behaviors and academic performances in web-based courses.*

Charles and Fisher (2004) in the study entitled with *Self-Regulated Learning in the Mathematics Class* found that SRL (self-regulated learning) provides a perspective on instruction that is valuable and that can help to promote the kind of classroom norms, which will support the development of powerful learning, and learners.

Cynthia D. Otts (2010) has also found in his study *Self-regulation and math attitudes: effects on academic performance in developmental math courses,* students using self-regulatory strategies earned higher grades in developmental math courses.

Educational Implication of the study

Studying mathematics by using Self-learning instructional material will help the students to learn mathematics in a systematic way further it will help the students to learn with their own capacity and their own speed.

In the present scenario when teachers have no sufficient time to give attention individually to students in a heterogeneous environment of classroom and to facilitate children with suitable remedial, need of such type of instructional material arose.

On the other hand this material has some characteristics such as it generates interest, is written primarily for learner use, is designed for a particular learner group, is structured according to the needs of learners and major emphasis on the self-assessment, etc, therefore it will help the student to get their grasp on mathematics and make them love mathematics.

Self-learning instructional Materials (SLIMs) differs from a chapter of a textbook or an article of a journal. The chapters of a textbook usually present information in a very compact form. They are closer to reference material than to learning materials. They are organized in terms of the subject matter rather than to aid learning. Similarly an article in a journal is a means

of communicating with equals in the profession. On the other hand, SLIMs is the instrument for self-learning for school level students.

On the other hand in the present time it is necessary for each and every student to become successful by getting a desirable job and be independent. For the purpose of being independent in many fields development of reasoning, mathematical skills, scientific attitude, systematic way of doing any work, self-evaluation and self-motivation, etc are very important. Most of the competitive exams contain a section of mathematics (consisting mathematical problems up to 8^{th} std.), so it is necessary for every stream student to have perfection in mathematical skills and problem up to 8^{th} std.. This study will be a small contribution and will be a trial to find the solution to make students capable of above-discussed skills. Significance of this study can be understood by the significance of the developed material:

1. Developing the mental faculties of the students by reasoning and logical thinking skills application.
2. Applicability of learning-based approach to the teaching-learning process.
3. Application of theoretical knowledge to real-life problems thus enhancing students' learning.
4. The students are responsible for their learning in a better way.
5. The teacher acts as facilitator of learning and not the master of it which gives freedom to the students for analysis, processing and solving the problem at their own pace.

This study also can help the school administrators as better overall performance of learners and improvement of results of school can be achieved by using this approach of teaching students. Self-learning approach can be used for improving discipline by keeping students engaged in self-learning activities. SLIMs can be developed on large scale for different subjects and distributed to the learners for self-study.

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