CHAPTER-5

SUMMARY, FINDINGS, EDUCATIONAL IMPLICATION AND SUGGESTIONS

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5.0.0 Prologue

The present chapter deals with the summary of the study along with the major findings and conclusions. It also gives recommendations on the basis of these findings, discusses the educational implication and suggestions for further research.

5.1.0 Summary

5.1.1 Overview of the Study

The study was designed to investigate whether the use of the NCERT Mathematics Kit in teaching Mathematics could bring a positive shift in students' Attitude, Interest, and Academic performance. The study was conducted on a single group of students from a central government school under RIE, Bhopal. The intervention consisted of teaching with the mathematics kit for a specific duration, and comparisons were made based on pre- and post-test results to assess the effect.

5.1.2 Objectives of the study

The main objective of the present study was to examine the impact of using the NCERT Mathematics Kit on students' attitude, interest, and achievement in mathematics. The researcher aimed to explore whether teaching with hands-on tools and activities could bring about significant improvement in learners' engagement and performance in the subject. The study sought to determine whether employing the mathematics kit in an activity-based learning environment may improve students' academic performance, boost their interest in the subject, and cultivate a more positive attitude toward mathematics. The researcher aimed to investigate whether learners may find abstract mathematical topics more tangible and significant through the use of interactive, captivating, and visual teaching aids.

5.1.3 Methodology Adopted

The study followed a pre-test and post-test experimental design. A group of 40 students from Demonstration Multipurpose School (DMS) under RIE, Bhopal, was selected for Experiment. The group was exposed to teaching with the NCERT Mathematics Kit, and their performance was assessed before and after the intervention. The experimental phase lasted for three weeks. During this period, a pre-test was conducted to assess the students' existing levels of attitude, interest, and achievement. Following this, the teaching intervention using the NCERT Mathematics Kit was implemented for 3weeks instructional days, after which a post-test was conducted to compare the gains and assess the impact of the treatment.

5.1.4 Variables of the Study

Keeping the objectives in view the following variables were considered for the study.

Independent Variables

In the present study, teaching approaches of mathematics are the independent variables.

1. Teaching mathematics with NCERT Mathematics kit

Dependent Variables

In the present study, dependent variables are

1. Mathematical achievement
2. Interest in learning mathematics
3. Attitude towards mathematics

5.1.5 Tools and Techniques Used

Three major tools were used in the study:

1. **Mathematics Interest Inventory** developed by B.N. Dubey, consisting of 40 items (20 positive and 20 negative statements) to assess students' interest level.
2. **Mathematics Attitude Scale** developed by Ali imam and Tahira, consisting of 22 items (11 positive and 11 negative statements) to assess students' Attitude towards Mathematics.
3. **Self-constructed Mathematics Achievement Test**, prepared by the researcher, which included a mix of multiple-choice, conceptual, and application-based

questions categorized into easy, moderate, and difficult levels, with a total of 30 marks.

5.1.6 Execution of the Experiment

The study followed a systematic procedure. In the first phase, the students were administered three separate pre-tests for attitude, interest, and achievement. These tests provided baseline data for comparison.

The second phase involved an intervention using the NCERT Mathematics Kit. Over the course of three weeks instructional days, selected mathematical concepts were taught using various components of the kit, such as geometrical models, measurement tools, algebraic devices, and manipulatives that allowed students to explore, experiment, and engage with mathematical ideas in a tactile and visual manner.

In the third phase, after the treatment period ended, the same pre-tests were re-administered to gather post-test data. This allowed for an accurate comparison of pre- and post-intervention performance and responses.

5.1.7 Statistical Method Used

For the analysis of data, inferential statistics were used. The t-test was applied to determine the significance of difference in means between pre-test and post-test scores for all three variables.

5.2.0 Major Findings of the Study

Major Findings of the Study were based on analysis of Post Test Scores are listed under this section.

5.2.1 Findings Related to Attitude towards Mathematics

- There is a significant difference between the mean scores of pre-test (66.85) and post-test (79.75) in the mathematical Attitude score of Students those class 8^{th} taught using NCERT Mathematics kit. The research found that the Mathematics Kit is an effective teaching-learning material in developing high positive Attitude towards mathematics among class 8^{th} students.

IMPACT

- Students showed a notable increase in attitude scores following the implementation of the NCERT Mathematics Kit.
- The interactive and hands-on nature of the kit contributed to a shift in perception, making mathematics appear more engaging and less stressful.

5.2.2 Findings Related to Interest in Learning Mathematics

- There is a significant difference between the mean scores of pre-test (23.85) and post-test (29.85) on Interest towards Mathematics of class 8^{th} students taught using NCERT Mathematics Kit. The research found that the Mathematics Kit is an effective teaching-learning material in developing Interest towards Mathematics among class 8^{th} students.

  IMPACT
- Students showed a marked increase in their interest levels after being taught with the help of the mathematics kit.
- The use of manipulatives, models, and visual aids fostered curiosity and excitement among learners.

5.2.3 Findings Related to Achievement in Mathematics

- There is a significant difference between the mean scores of pre-test (17.35) and post-test (22.28) in the Mathematical Achievement of class 8^{th} students taught using NCERT Mathematics Kit. The research found that the Mathematics Kit is an effective teaching-learning material to enhance Academic achievement in Mathematics among class 8^{th} students.

  IMPACT
- Students found it easier to grasp and remember math ideas when they learned using the kit-based approach.
- The activity-oriented teaching approach enhanced conceptual clarity and problem-solving skills.

5.3.0 Discussion and Conclusion of the Result

In the realm of education, a significant challenge is the rising incidence of failures in mathematics at both secondary and Higher secondary levels. Numerous factors contribute to the high failure rates observed in various examinations, with one prominent cause being ineffective teaching and learning strategies. In contemporary society, acquiring mathematical skills is essential for an individual's comprehensive development. Despite its relevance and significance, many students view mathematics as challenging, tedious, impractical, and abstract. Consequently, the persistent low achievement levels in mathematics among students have been observed. Various elements influence students' success in mathematics, one of which is their apprehension towards the subject. This mathematical anxiety is often rooted in negative attitudes towards mathematics and a lack of interest in the subject.

In recent years, using kits and teaching materials in math has become a popular and effective alternative to traditional teaching methods. Math, which students often find abstract and hard, can be made more tangible, interesting, and easier to understand with educational kits and hands-on tools. In the context of the present study, the use of the NCERT Mathematics Kit was examined to assess its impact on students' attitude, interest, and achievement in mathematics. The kit facilitated a deeper understanding of core concepts, supported differentiated learning styles, and made abstract content more understandable. This experiential mode of learning encouraged participation, retention, and self-confidence in problem-solving. The results of the study show that hands-on and experience-based learning methods work better than regular lectures. Using kits made learning more fun, engaging, and important for students. The results of the study show that hands-on and experience-based learning methods work better than regular lectures. Using kits made learning more fun, engaging, and meaningful for students.

As a result of this exposure, the experimental group showed a lot of improvement in their Mathematical Achievement, Interest in learning Mathematics and Attitude towards Mathematics. The results revealed that there was a significant difference in pre and post-test achievement test scores, interest in learning mathematics and attitude towards mathematics. Their success can be attributed to the teaching mathematics with the transitional background music approach.

Overall Impact of the NCERT Mathematics Kit:

- The comprehensive evaluation indicates that the NCERT Mathematics Kit had a beneficial effect on both the cognitive and emotional aspects of students
- Students not only improved academically but also developed a more favorable disposition toward the subject.
- The kit-based teaching method proved effective in making learning mathematics more meaningful and enjoyable.

5.4.0 Educational Implications

1. The experiment conducted by the researcher reveals that teaching Mathematics with NCERT Mathematics Kit is significantly more effective in developing Attitude towards Mathematics among Secondary school students. Therefore the schools can adopt the Mathematics kit approach in Mathematics teaching for the development of Attitude towards Mathematics.

2. It was found that the teaching mathematics with NCERT Mathematics Kit is significantly more effective in developing Interest in learning Mathematics among Secondary school students. Therefore the schools can adopt Mathematics kit approach in Mathematics teaching for the development of Interest in learning mathematics.

3. It was found that the teaching mathematics with NCERT Mathematics Kit is significantly more effective in developing Academic achievement in Mathematics among Secondary school students. Therefore the schools can adopt Mathematics kit approach in Mathematics for improving the academic achievement in mathematics.

4. Mathematics kit was equally effective for both boys and girls in developing Attitude towards mathematics and Interest in learning mathematics. Hence, boys and girls need not be segregated in the classroom on the basis of their gender in fostering the attitude towards the mathematics and interest in learning mathematics.

5. The mathematics teachers working in secondary school level can make use of the mathematics kit in their classroom to attract the students towards the subject.

6. The kit helps teachers turn textbook activities into real classroom experiences. Instead of just explaining concepts, teachers can use the kit to make visual and hands-on models, allowing students to see and interact with objects that relate to what they are

learning. This approach enhances understanding, keeps students engaged, and clarifies concepts.

7. The kit promotes inclusive education by accommodating students with different abilities and learning preferences. It fosters peer discussions, collaborative work, and active engagement, turning math classrooms into lively and enjoyable learning environments. This approach is particularly effective in alleviating math anxiety among learners.

5.5.0 Suggestions for the further study

Followings could be the suggestions for the further researchers related to the present study.

- Students from different classes can be involved in research to evaluate the kit's effectiveness across various learning levels.
- Future studies could explore combining the Mathematics Kit with digital tools to enhance learning.
- This study can be further extended by involving more different variables like Self-awareness, problem solving ability, decision making etc.
- A comparative study can be done to know the difference between its impact on government and private school students.
- Research can examine how effectively training teachers to use the kit impacts students' learning.
- Researchers can evaluate the effectiveness of the kit in teaching subjects such as geometry, algebra, or fractions.
- Further studies can also examine how the kit transforms the classroom, enhancing collaboration, engagement, and interaction between students and teachers.