CHAPTER-V

RESULTS AND FINDINGS

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5.1. RESULTS

- As the calculated value of 't' i.e., 2.024 is greater than table value at 0.05 level of significance for degree of freedom 38 i.e., 2.024, therefore, 't' value is **significant** and null hypothesis is **rejected.** Thus, it can be stated that there is a **significant difference** in the achievement scores of two groups taught by traditional method and toy-based pedagogy. The mean gain score of the students in the experimental group is 10.75, which is higher than those of the mean gain score of the students in the control group i.e., 7.65.

- As the calculated value of 't' i.e., 2.015 is greater than table value at 0.05 level of significance for degree of freedom 38 i.e., 2.015, therefore, 't' value is **significant** and null hypothesis is **rejected.** Thus, it can be stated that there is a **significant difference** in the achievement scores on the basis of gender taught by traditional method and toy-based pedagogy. The mean gain score of the male students is 10.173, which is higher than those of the mean gain score of the female students 7.882.

5.2. MAJOR FINDINGS

- The findings of the study indicate that toy-based pedagogy is significantly more effective than traditional methods in improving the mathematics achievement of Class 6 students. The calculated *t*-value of 2.024 exceeded the critical value at the 0.05 level of significance for 38 degrees of freedom, leading to the rejection of the null hypothesis. This suggests a significant difference in achievement scores between the experimental group, which received toy-based pedagogy, and the control group, which was taught through traditional methods. The experimental group showed a higher mean gain score of 10.75 compared to 7.65 for the control group. This clearly reflects the positive impact of toy-based pedagogy on student learning.

- Additionally, the study found a significant difference in achievement scores based on gender. The *t*-value of 2.015 also surpassed the critical value at the 0.05 level of significance, resulting in the rejection of the second null hypothesis. This finding indicates that toy-based pedagogy and traditional methods influence male and female students differently. Male students achieved a higher mean gain score of 10.173 compared to 7.882 for female students.

5.3. EDUCATIONAL IMPLICATIONS OF THE STUDY

The findings of this study carry several important implications for educational practice, particularly in the context of teaching mathematics at the elementary level. For students, toy-based pedagogy offers an engaging and hands-on learning experience that helps them develop a deeper understanding of mathematical concepts. It fosters active participation, enhances motivation, and supports the development of critical thinking, creativity, and problem-solving abilities. For teachers, the study highlights the need to adopt innovative and student-centered instructional approaches that go beyond traditional rote learning. By integrating educational toys and manipulatives into lessons, teachers can make abstract ideas more concrete and relatable.

Teacher educators play a crucial role in preparing future educators to effectively implement toy-based strategies. Therefore, teacher education programs should include training on the use of educational toys, constructivist approaches, and reflective teaching practices. This ensures that teachers are equipped with the necessary pedagogical skills and confidence to create interactive and meaningful learning environments. Curriculum designers are also encouraged to integrate toy-based activities within the mathematics curriculum to align with diverse learning styles and developmental needs. Curriculum frameworks should support experiential learning by including activity-based lessons and assessments that promote holistic development.

For school administrators, the study underscores the importance of providing the necessary infrastructure and resources, such as access to educational toys and teacher training workshops. Administrators should foster a school culture that supports innovation in pedagogy and recognizes the value of interactive teaching methods. Additionally, policy-level support is essential to institutionalize toy-based pedagogy in mainstream education. Overall, the study reinforces the need for a collaborative effort among all stakeholders to create a dynamic, inclusive, and effective learning environment that enhances mathematical achievement and lifelong learning skills among students.

Several educational implications of this study given as follows:

5.3.1. For Students:

- Toy-based pedagogy enhances **conceptual clarity** and encourages students to engage with mathematics in an **enjoyable and meaningful** way.
- It supports **active participation**, which leads to better retention and understanding of mathematical concepts.
- The approach promotes **critical thinking**, creativity, and problem-solving skills through hands-on experiences.
- It caters to **different learning styles**, making mathematics more accessible and inclusive for all learners.

5.3.2. For Teachers:

- The study emphasizes the need for teachers to adopt **student-centered instructional strategies** like toy-based learning to improve classroom engagement and outcomes.
- Teachers should be encouraged to use **educational toys and manipulatives** to make abstract concepts more concrete.
- It highlights the importance of **flexibility and innovation** in teaching approaches to enhance learning effectiveness.
- Regular **reflection and assessment** of teaching strategies can help teachers optimize the use of toy-based methods.

5.3.3. For Teacher Educator:

- Teacher educators should incorporate **training modules on toy-based pedagogy** into pre-service and in-service teacher education programs.
- They must equip future teachers with the **skills to design, select, and use educational toys** effectively in the classroom.
- Emphasis should be placed on **constructivist learning theories**, experiential learning, and reflective teaching practices.
- Encouraging **action research and experimentation** with toy-based strategies during teacher training can build confidence and competence.

5.3.4. For Curriculum Designers:

- The study suggests integrating **toy-based and experiential learning activities** into the mathematics curriculum at the elementary level.
- Curriculum frameworks should encourage **activity-based assessments** that align with toy-based pedagogy.
- Learning outcomes should include **cognitive, affective, and psychomotor domains**, which are supported by interactive and playful methods.
- Curriculum materials can include **guidelines and examples** for using low-cost or locally available toys to ensure accessibility.

5.3.5. For Administrators:

- Administrators should facilitate the **availability of resources**, including educational toys and learning materials, in schools.
- They should organize **professional development programs** to support the implementation of toy-based pedagogy.
- Policies should promote **innovative teaching practices** that go beyond rote memorization and encourage conceptual learning.

- Monitoring and evaluation systems should be updated to **recognize and support creative pedagogical approaches** in schools.

5.4. SUGGESTION FOR FURTHER STUDIES

Looking to the constraints under which the study was concluded the findings do not warrant any generalization it is therefore felt that replication of this study on a large sample is requested to arrive at generalization, however studies may be undertaken on the followings:

- Adopt **toy-based and activity-oriented strategies** to make mathematics more engaging and relatable for learners.
- Utilize **low-cost or DIY toys** to ensure accessibility in classrooms with limited resources.
- Promote **constructivist learning** by encouraging students to explore, experiment, and reflect during toy-based activities.
- Integrate **real-life context** through toys to make abstract mathematical concepts tangible and easier to grasp.
- Provide opportunities for **collaborative learning** through group activities involving toys to build social and communication skills.
- Use toys not just as tools but as **pedagogical resources** for conceptual clarity and to stimulate higher-order thinking.
- Reflect regularly on the **effectiveness of toy-based strategies** and adapt methods based on student feedback and outcomes.
- Ensure inclusivity by designing activities that cater to **diverse learning styles and abilities**.

5.5. SUMMARY

This dissertation investigates the effectiveness of toy-based pedagogy in enhancing mathematics achievement among Class 6 students, focusing on key topics such as Mensuration, Integers, and Symmetry. Conducted using a true experimental design, the study involved 40 students from a Demonstration Multipurpose School in Bhopal, divided into control and experimental groups. The experimental group received instruction through toy-based pedagogy while the control group was taught using traditional methods. Pre-tests and post-tests were administered to assess learning

outcomes. Statistical analysis revealed that toy-based pedagogy significantly improved student performance, with the experimental group demonstrating higher mean gain scores than the control group. Additionally, a gender-based analysis showed that male students achieved slightly higher gains than female students, though both benefitted from the approach. The study concludes that integrating educational toys into mathematics instruction promotes active learning, conceptual clarity, and greater engagement. It supports the recommendations of NEP 2020 and suggests broader implementation of toy-based strategies in classrooms. The findings offer valuable insights for students, teachers, curriculum designers, and educational policymakers seeking innovative and inclusive pedagogical practices.