CHAPTER-I

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1.1. INTRODUCTION

The evolution of pedagogical practices has been significantly influenced by advancements in cognitive psychology, educational technology, and socio-cultural shifts. Among the many innovative approaches to teaching and learning that have emerged in recent decades, toy-based pedagogy stands out as an experiential and learner-centered method that leverages the power of play to foster cognitive, emotional, and social development. Toy-based pedagogy refers to the integration of educational toys and play materials into the curriculum to enhance conceptual understanding and skill acquisition in a fun, engaging, and meaningful way. Rooted in constructivist learning theories, this pedagogical model emphasizes active learning, collaboration, creativity, and contextualization of abstract concepts (Piaget, 1952; Vygotsky, 1978).

The National Education Policy (NEP) 2020 of India emphasizes the importance of toy-based pedagogy, especially in the foundational years of education. Recognizing the value of play in early learning, NEP 2020 advocates for a curriculum that is flexible, multi-faceted, and play-based to foster holistic development. It encourages the integration of local and indigenous toys to connect children with their cultural heritage while making learning enjoyable and contextually relevant. By incorporating toys into the educational process, NEP 2020 aims to enhance cognitive, social, and emotional growth. The policy also highlights the need for teacher training in toy-based methods and promotes inclusive practices to ensure all children, including those with special needs, benefit from this engaging approach. Overall, NEP 2020 envisions a child-centered education system where toys and play a crucial role in creating a joyful and effective learning environment.

Toy-based pedagogy in mathematics leverages the natural curiosity and playfulness of children to teach complex concepts through interactive and hands-on activities. By using tools such as building blocks, abacuses, number puzzles, and measuring toys, educators can transform abstract mathematical ideas into tangible experiences. This approach not only makes learning enjoyable but also enhances comprehension and retention. For instance, children can learn about geometry and spatial relationships through constructing shapes with LEGO, or grasp basic arithmetic using counting toys and board games. Additionally, manipulatives like fraction circles and digital apps provide visual and tactile methods to explore fractions and decimals. Overall, toy-based pedagogy fosters a deeper understanding of mathematics by engaging students in meaningful, playful learning experiences.

Play refers to the activities that are freely sought by individuals or groups entirely for enjoyment. It has an important mechanism on a child's cognitive, social, and emotional development (APA Dictionary of psychology, 2022). Play assists children to gain self-regulation, language, Mathematics skills, and social and cognitive competencies (Copple &

Bredekamp, 2009; Sluss, 2005; Meaney et al., 2014). Children develop knowledge while they are playing which is why Montessori, Reggio Emilia, and Froebel considered play as an effective pedagogy for children's Learning (Sluss, 2005; Samuelsson & Carlsson, 2008). "Nazmin Sultana (2023)".

Toy-based pedagogy is increasingly being recognized as an effective and inclusive educational approach. It transforms learning into an interactive and joyful experience by incorporating toys, games, and manipulatives into the instructional process. These tools serve not merely as playthings but as cognitive and pedagogical aids that bridge the gap between theory and practice. Ailwood (2003) noted that structured play through educational tools can stimulate emotional, social, and intellectual development.

The integration of toys in the teaching-learning process is not merely an aesthetic enhancement of education; it is a strategic shift rooted in cognitive science and educational psychology. Ginsburg (2007) emphasized that play-based learning, especially when guided by an educator, can facilitate critical cognitive functions such as problem-solving, reasoning, and abstract thinking. The **National Education Policy (NEP) 2020** of India has underscored the importance of play-based and toy-based learning, especially in foundational and preparatory stages, thus institutionalizing its relevance in formal education (MoE, 2020).

1.2. CONCEPT AND DEFINITION OF TOY-BASED PEDAGOGY

Toy-based pedagogy refers to the **intentional, curriculum-aligned use of toys and play materials in teaching to foster academic, social, and emotional learning**. Unlike unstructured play, toy-based pedagogy has clear educational objectives and is planned to meet curriculum outcomes. Wood and Attfield (2005) define this approach as "a pedagogical framework that utilizes play materials for structured yet flexible learning experiences, aiming to develop a broad range of student competencies."

1.2.1. CHARACTERISTICS OF TOY-BASED PEDAGOGY

This pedagogical method exhibits several defining features:

- **Active Learning**: Students engage directly with materials, enabling deeper learning through discovery.
- **Multisensory Stimulation**: Toys engage multiple senses, helping to cater to diverse learning styles.
- **Collaborative Engagement**: Toys often promote peer interaction, fostering cooperation and communication.
- **Inclusivity**: Toy-based activities can be adapted for learners with varied needs and abilities (Saracho & Spodek, 1998).

1.2.2. TYPES OF EDUCATIONAL TOYS

Toys used in pedagogy can be broadly classified into:

- **Manipulatives**: Building blocks, counters, and tangrams used to teach math concepts (Clements & Sarama, 2007).
- **Puzzle Toys and Games**: Enhance logical reasoning and spatial awareness (Berk, 2009).
- **Cultural and Indigenous Toys**: Promote appreciation of local heritage and contextualized learning (Kumar, 2021).
- **Digital Toys**: Support interactive and tech-based learning through apps and robotic kits (Plowman & Stephen, 2005).

Each type of toy serves specific learning goals and can be selected based on curriculum needs, student level, and subject matter.

1.2.3 THEORETICAL FOUNDATIONS OF TOY-BASED PEDAGOGY

The effectiveness of toy-based pedagogy is supported by several foundational learning theories.

- **PIAGET'S CONSTRUCTIVIST THEORY**
  Jean Piaget's cognitive development theory posits that children actively construct knowledge through their experiences. According to Piaget (1952), toys provide the "tools for thinking" that enable children to manipulate their environment, thereby promoting schema development through assimilation and accommodation.
- **VYGOTSKY'S SOCIO-CULTURAL THEORY**
  Lev Vygotsky emphasized the role of social interaction and cultural tools in learning. Toys serve as **mediating tools** within a child's Zone of Proximal Development (ZPD), where learning is most effective when scaffolded by an adult or peer (Vygotsky, 1978). Collaborative play involving toys enables guided discovery and co-construction of knowledge.
- **GARDNER'S THEORY OF MULTIPLE INTELLIGENCES**
  Howard Gardner's theory (1983) proposes that intelligence is not singular but multifaceted. Toy-based activities can be designed to target various intelligences such as logical-mathematical (using number games), bodily-kinesthetic (using construction sets), and interpersonal (through cooperative games).
- **MONTESSORI METHOD**
  Maria Montessori advocated for structured, purposeful play through didactic materials, many of which resemble toys. Her method aligns with toy-based pedagogy in emphasizing hands-on learning, autonomy, and the child's natural drive for discovery (Montessori, 1912).

1.2.4. TOY-BASED PEDAGOGY IN THE INDIAN EDUCATIONAL CONTEXT

India's education system, marked by large class sizes and diverse learner needs, faces challenges in ensuring quality learning outcomes. Toy-based pedagogy offers a promising solution, especially in under-resourced and multilingual classrooms. Its application in Indian classrooms is supported by:

- **NEP 2020**: Calls for "discovery-based, discussion-based, and analysis-based learning" starting from foundational stages (MoE, 2020).
- **Toycathon 2021**: A national initiative to promote indigenous toy design aligned with educational objectives.
- **Experiential Learning Mandates**: CBSE and NCERT now encourage activity-based assessments and classroom practices (NCERT, 2019).

Kumar and Garg (2022) report that integrating locally made toys in rural classrooms not only improved attendance but also enhanced students' understanding of abstract topics such as fractions and symmetry.

1.3. RATIONALE

The rationale of a study outlines the reasons behind conducting research and provides a justification for the chosen topic and objectives. In the context of the study on the "**A Study of Effect of Toy Based Pedagogy on Achievement in Mathematics of Class 6th Students**."

The following rationales can be considered:

Integration of play based pedagogy in Education.

Enhancing mathematics Education.

Addressing diverse learning styles.

Promoting active engagement.

NEED AND SIGNIFICANCE OF THE STUDY

Engagement in mathematics is crucial for several reasons. Firstly, it addresses the diverse learning preferences of students, offering a potential avenue to cater to visual and auditory learners. Secondly, the use of Toy based pedagogy can significantly enhance engagement by presenting information in an interactive and captivating format, potentially making the learning experience more enjoyable. Thirdly, in the context of mathematics, which often involves complex calculation and skills concepts can provide a tangible and immersive learning experience, aiding comprehension. Additionally, exploring the impact of educational toys at this stage is essential for understanding how toys integration aligns with the developmental needs of students and contributes to their overall academic motivation and achievement. This study holds the promise of not only informing instructional practices but also contributing valuable insights to the ongoing discourse on effective pedagogy and educational innovation.

This study is significant in light of the growing recognition of experiential and toy-based learning as an effective pedagogical approach, especially in Mathematics education. Mathematics is often seen as a challenging and abstract subject, particularly at the middle school level. Toy-based pedagogy provides an engaging, hands-on method to simplify complex mathematical concepts, catering to diverse learning styles including visual, auditory, and kinesthetic learners. By incorporating educational toys and manipulatives into teaching, students can actively participate in their learning process, which enhances motivation, creativity, and conceptual clarity. The study gains further importance considering the recommendations of the National Education Policy (NEP) 2020, which advocates for the integration of play-based and activity-based learning in formal education, especially at the foundational and preparatory stages. In this context, the study not only explores the pedagogical effectiveness of toys in improving mathematical achievement but also supports national educational reforms aimed at holistic and inclusive learning. Furthermore, the research provides valuable insights for teachers, curriculum designers, and policy makers on how to utilize low-cost or indigenous toys to improve classroom engagement and learning outcomes. It contributes to the body of empirical research by providing data on the practical benefits of toy-based pedagogy in real classroom settings, thereby offering a strong foundation for further studies and policy implementation.

1.4. STATEMENT OF THE PROBLEM

The present study entitled as "**A Study of Effect of Toy Based Pedagogy on Achievement in Mathematics of Class 6th Students.**"

1.5. OBJECTIVES OF THE STUDY

1.5.1. To compare the mean achievement scores in mathematics of students taught through Toy-based pedagogy and traditional method.

1.5.2. To compare the mean achievement scores in mathematics of students taught through Toy-based pedagogy and traditional method on the basis of gender.

1.6. HYPOTHESIS OF THE STUDY

1.6.1. There is no significant difference between the mean achievement scores in Mathematics of students taught through Toy-based pedagogy and traditional method.

1.6.2. There is no significant difference between the mean achievement scores in Mathematics of students taught through Toy-based pedagogy and traditional method on the basis of gender.

1.7. OPERATIONAL DEFINITION

Educational toys: Toys specially designed to convey educational content with the intention of facilitate learning.

Traditional Method: The traditional method refers to a method of problem-solving or decision-making that has been used for a long time and is considered conventional or established

Toy Based Pedagogy: Toy-based pedagogy refers to the intentional, curriculum-aligned use of toys and play materials in teaching to foster academic, social, and emotional learning.

1.8. DELIMITATION OF THE STUDY

The delimitations of the study are as follows-

- Experiment was conducted only in Demonstration Multipurpose School, Bhopal, M.P.
- Sample consists of Class 6^{th} studenty only.
- Instructional intervention of only 21 days was given by the researcher.