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# Assessing the Effectiveness of Play-Based Learning in Enhancing Cognitive Development among Primary School Children: A Case Study of Selected Schools in Mansa District, Luapula Province

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**Abstract.** This study investigates the effectiveness of play-based learning in enhancing cognitive development among primary school children in selected schools within Mansa District, Luapula Province. Employing a mixed-methods case study approach, data were collected through classroom observations, cognitive assessments, and interviews with teachers, students, and parents. Findings reveal that play-based learning significantly improves critical thinking, problem-solving, creativity, and engagement among learners. Additionally, it fosters social and emotional development, contributing to holistic child growth. Despite these benefits, challenges such as inadequate resources, limited teacher training, and cultural attitudes hinder its full integration into the curriculum. The study recommends increased investment in teacher capacity building, resource provision, and curriculum reforms to promote play-based learning as a central pedagogical strategy. Overall, the findings underscore the vital role of play in cognitive development and advocate for its wider adoption in primary education within the district.

**Index Terms-** Play-Based Learning, Cognitive Development, Primary School Children, Mansa District, Luapula Province, Educational Strategies, Child Development, Teaching Methods

## I. Introduction

Play as a learning concept has gained both praise and criticism in the learning community. Despite the fact that there are many benefits to play-based learning (which we will cover in great detail), many research studies have highlighted the difficulties presented when attempting to change different beliefs and practices teachers have about play. Moreover, various reviews of play and child development conducted in the USA, have shown that play has declined both in quality and quantity over recent years (Hunter and Walsh (2014a)).

Despite this, the play seems to be an integral part of human development and a cornerstone when learning to socialize with other human beings, and even among animals, the play has been observed and studied in great detail. In fact, play has long been identified as a potential indicator of the current welfare state of an animal and is

commonly linked to the experience of positive emotions in animals, just as it has been observed in humans (Held and Špinka (2011)).

## II. Literature Review

### 1. Empirical Evidence on the Cognitive Benefits of Play-Based Learning

Numerous studies affirm that PBL supports intellectual growth. A longitudinal study by Lillard et al. (2013) comparing Montessori and traditional classrooms found that children in play-based environments had significantly better academic and executive function scores by the end of the study period. Similarly, Whitebread et al. (2012) showed that children who engaged in purposeful play demonstrated higher metacognitive skills—they were more aware of their thought processes, could reflect on tasks, and adjusted strategies accordingly.

In another study, Hirsh-Pasek et al. (2009) found that children in a play-based math curriculum outperformed their peers from traditional instruction models in terms of conceptual understanding and problem-solving ability.

Furthermore, Pellegrini and Holmes (2006) linked unstructured outdoor play (recess) with improved classroom focus and task performance, suggesting that physical play enhances attention and working memory.

## III. Research Methodology

### 1. Research Design

The study employed a mixed-methods research design, combining quantitative and qualitative approaches. This design was chosen because the phenomenon under investigation—play-based learning and its influence on cognitive development—is multifaceted and requires both statistical evidence and contextual understanding.

### 2. Study Area

The research was conducted in Lukangaba Zone, located within Mansa District of Luapula Province, Zambia.

### 3. Target Population

The target population comprised:

- Grade 2 and Grade 3 pupils:
- Classroom teachers
- Headteachers

### Sampling Techniques

The study utilized a combination of sampling methods: Purposive Sampling, Simple Random Sampling and Convenience Sampling

### 4. Data Collection Methods

A combination of primary data collection methods was employed:

**5. Research Instruments**

The tools used in data collection included: Teacher Questionnaire, Interview Guide, Observation Checklist and Pupil Assessment Tools:

**6. Data Analysis**

- Quantitative data from questionnaires and cognitive assessments were entered into SPSS (Statistical Package for the Social Sciences) for analysis.
- Qualitative data from interviews and observations were transcribed and analyzed using thematic analysis. Responses were coded and grouped into emerging themes such as "benefits of play", "challenges in implementation", and "administrative support".

## IV. Data Presentation and Findings

**1. Demographic Information of Respondents**

The study was conducted in three primary schools, selected to represent varying levels of resource availability and infrastructure. The pupil-to-teacher ratio was adjusted to 40:1, reflecting the actual conditions in many rural Zambian schools where overcrowded classrooms are common.

**2. Teachers' Perspectives on Play-Based Learning**

**Understanding of Play-Based Learning**

All 9 teachers demonstrated awareness of PBL, but their interpretations revealed gaps in pedagogical depth:

- 44% (4 teachers) equated PBL with "games and fun activities," focusing on engagement rather than learning outcomes.
- 33% (3 teachers) linked PBL to "multisensory tools like songs and storytelling," showing a broader but still limited view.
- 22% (2 teachers) described PBL as "a structured method to develop problem-solving and critical thinking," aligning with global best practices.

**3. Types of Play Activities Used**

Activities were categorized into four groups, with researcher observations on effectiveness:

**Role-Play and Drama (Used by 67% of teachers)**

- **Example:** Pupils acted as shopkeepers and customers to practice arithmetic and communication.
- **Observed Impact:** Improved verbal expression but limited depth in problem-solving due to lack of scaffolding.

**Storytelling with Picture Cards (56% of teachers)**

- **Example:** Teachers used handmade cards to narrate stories, prompting pupils to predict outcomes.
- **Observed Impact:** Enhanced vocabulary but rarely linked to writing tasks, missing literacy integration opportunities.

**Puzzles and Memory Games (44% of teachers)**

- Example: Shape-matching games made from recycled cardboard.
- Observed Challenge: Pupils in overcrowded classrooms (40:1) struggled to share materials, leading to conflicts.

**Counting Games with Physical Objects (89% of teachers)**

- Example: Bottle tops for addition/subtraction.
- Researcher Note: This was the most scalable activity, requiring no cost and accommodating large groups.

**4. Benefits Observed by Teachers**

**Finding**

- Pupils in PBL classrooms displayed higher resilience when tackling difficult tasks, persisting 50% longer than peers in traditional settings.

**5. Challenges in Implementation**

**Inadequate Materials (100% of teachers)**

- Schools relied on donations for 80% of learning aids, with only 10% being PBL-specific.

**Large Class Sizes (40:1 ratio)**

- Teachers spent 30% of PBL time managing behaviour
- rather than facilitating learning.

**Lack of Training (44% of teachers)**

- Only 2 teachers had attended a PBL workshop, and none had received follow-up support.

**Researcher Recommendation**

- Cluster training could help teachers share low-cost PBL strategies tailored to overcrowded classrooms.

**6. Classroom Observation Results**

- While PBL showed benefits even in 40:1 settings, its effectiveness was significantly diluted compared to smaller classes.

**7. Cognitive Assessment Results**

- For every 10-pupil increase in class size, average cognitive scores dropped by 1.3 points, highlighting the inverse relationship between overcrowding and PBL efficacy.

**8. Headteacher Interviews**

**Systemic Neglect**

- "The ministry provides chalk and textbooks, but nothing for play. How can we innovate without support?"

**Assessment Paradox**

- Standardized tests ignore PBL outcomes, forcing teachers to prioritize rote learning.

**V. Discussion of Findings**

The study's findings on the effectiveness of play-based learning (PBL) in Mansa District provide a nuanced understanding of how this pedagogical approach functions in resource-constrained environments. Below is an expanded discussion that delves deeper into the data, interprets its implications, and situates the findings within broader educational and socio-economic contexts.

**Conclusion**

The study's findings illuminate both the transformative potential of PBL in Mansa District and the structural barriers that hinder its full implementation. While PBL has demonstrably improved engagement, resilience, and foundational skills, its effectiveness is mediated by teacher capacity, class size, and resource availability. A multi-pronged approach—combining targeted training, resource provision, and policy reform—is essential to unlock PBL's promise as an equitable pedagogical tool.

Play-based learning is not a luxury but a necessity, particularly in settings where children face multiple adversities. By addressing systemic challenges, stakeholders can ensure that PBL becomes a cornerstone of quality education in Mansa and beyond.

## VI. Recommendations and Conclusion

**Recommendations**

The success of PBL in Mansa District hinges on sustained collaboration among all stakeholders. By investing in teacher capacity, equitable resources, and child-centered policies, Zambia can harness the transformative power of play to create inclusive, engaging, and effective learning environments. This study contributes to the global discourse on PBL by highlighting its adaptability to diverse contexts and its critical role in achieving equitable quality education.

**Conclusion**

This thesis has investigated the impact of play-based learning on the developmental domains of elementary school children and examined the substantial barriers to its
implementation. Our systematic review confirms that PBL not only supports significant gains in cognitive function, social competence, and emotional resilience but also aligns with

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