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The Role of Activity-Based Learning in Fostering Problem-Solving Skills Among ECE Children in Private Schools of District East Karachi

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Abstract

This study explores effectiveness of Activity-Based Learning (ABL) in enhancing problem-solving skills among Early Childhood Education (ECE) learners in private schools of district East, Karachi Pakistan. A mixed-methods approach was employed. Quantitative data were collected using structured Likert-scale questionnaires to assess enhancement in children's problem-solving abilities before and after ABL interventions. While qualitative data were collected through a semi-structured questionnaire for the suggestions to bring further improvements in the problem-solving skills of ECE learners. These questionnaires were administered to the teachers involved in early childhood education in four private schools of district East, Karachi. Ten structured ABL activities were chosen. These activities, targeting cognitive, logical, and socio-emotional problem-solving domains, were employed by the teachers. Findings highlight significant improvements in children's ability to identify, analyze, and solve the problems. The study concludes that ABL is a powerful pedagogical strategy for strengthening early problem-solving abilities of ECE learners, and recommends that teacher's training, parental engagement and policy level support, will help further maximize its effectiveness.

Keywords: *Activity-Based Learning (ABL), Problem-Solving Skills, Early Childhood Education (ECE), Private Schools*

Introduction

Early Childhood Education (ECE) is widely recognized as a critical stage for children's cognitive, social, and emotional development. Among the essential cognitive skills developed during this period, problem-solving is particularly important, serving as the foundation for reasoning, creativity, and lifelong learning (Piaget, 1972; Vygotsky, 1978). Activity-Based Learning (ABL), a hands-on and child-centered pedagogical approach, enables learners to interact with materials, collaborate with peers, and engage with real-life problems in meaningful ways (Epstein, 2014).

In the context of Pakistan, particularly within private school settings, the implementation of ABL in ECE classrooms is still emerging, and empirical evidence regarding its effects on problem-solving skills remains limited. Understanding the role of ABL in this context is therefore critical for designing curricula and instructional practices that promote holistic development and cognitive growth in early learners.

This study aims to investigate the impact of ABL on the development of problem-solving skills among ECE children in private schools of district East, Karachi, while also considering the perspectives of teachers who implement these pedagogical strategies. Traditional teacher-

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centered approaches often emphasize rote memorization and passive learning, which limits opportunities for children to actively engage in problem-solving activities. In contrast, ABL emphasizes hands-on, collaborative, and play-based learning, allowing children to construct knowledge through exploration, experimentation, and social interaction (Fleer, 2015; Higgins, Xiao, & Katsipataki, 2019).

Research has demonstrated that ABL not only enhances cognitive abilities but also promotes motivation, engagement, and social skills in young learners. Integrating play and experiential activities in ECE supports children's active participation and strengthens problem-solving competencies (Fleer, 2015). Furthermore, ABL fosters critical thinking, creativity, and collaborative skills, which are essential for tackling real-life problems (Higgins, Xiao, & Katsipataki, 2019). Despite these benefits, ABL implementation in private ECE schools in Karachi remains inadequate. Teachers often face challenges such as insufficient training and lack of structured guidance for integrating play-based learning. There is a need to examine both the impact of ABL on children's problem-solving skills and teachers' perceptions regarding its successful implementation. This study employs a mixed-methods approach, combining both the quantitative and the qualitative methods. Improvement noticed in children's problem-solving abilities after performing ABL will be jotted down and suggestions given by teacher to yield better results from ABL process, will be penned down. Through this design, the research seeks to provide a comprehensive understanding of ABL's effectiveness and to identify strategies for further enhancing early childhood pedagogy in the local context.

Statement of the Problem

Early childhood is a crucial stage for developing problem-solving skills, yet many private ECE classrooms in Karachi rely on traditional, teacher-centered methods that limit active thinking. ABL offers hands-on, playful, and child-centered experiences that encourage exploration, creativity, and problem-solving. Despite its proven benefits globally, ABL's impact in Pakistani ECE settings remains underexplored. This study investigates how ABL can foster problem-solving skills in young learners and highlights teachers' suggestions to further improve its effectiveness.

Objectives of the Study

- Understanding the impact of Activity-Based Learning (ABL) on problem-solving skills in ECE children.
- Explore teachers' perceptions to further enhance problem-solving skills in ECE children, using ABL.

Research Questions

- How does participation in ABL activities influence children's ability to identify and define problems?
- How does engagement in ABL activities enhance children's problem-solving skills?
- What changes do teachers observe in children's problem-solving abilities before and after ABL implementation?
- What do teachers propose to yield better results from ABL process.

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Significance of the Study

This study is significant as it contributes empirical evidence on the effectiveness of ABL in fostering problem-solving skills among ECE learners in private schools of district East, Karachi. It provides insights into how hands-on and play-based instructional practices enhance children's cognitive development at early age. It offers suggestions for policy makers, parents and school administrators for effective integration of ABL to yield better results. By addressing a gap in local research, the study strengthens understanding of ABL's role in improving early problem-solving competencies in the Pakistani educational context.

Review of Related Literature

Research has shown that ABL and related pedagogical strategies significantly enhance problem-solving skills among early childhood learners. Studies in preschool and ECE contexts demonstrate that engaging children in hands-on, inquiry-based, or project-based activities fosters creativity and critical thinking. For example, Bahar and Aksüt (2020) investigated effects of activity-based science teaching practices on preschool children and found a significant improvement in problem-solving skills among 5–6-year-old learners. Similarly, Küçükkara and Aksüt (2021) reported that activity-based algorithm training enhanced the problem-solving abilities of children in the same age group. Dal Berberoğlu and Alabay (2021) examined inquiry-based problem-solving activities and confirmed positive effects on children's problem-solving development. Project-based approaches were also found to be effective: Fatiya and Nur Hayati (2024) and Güley and Keskinkılıç (2024) noted that project-based learning significantly enhanced problem-solving skills in early childhood learners, with project approach programs showing greater growth compared to traditional methods. Moreover, Siwi and Dewi (2024) highlighted effectiveness of the problem-based learning models, and Bayındır (2023) emphasized that stronger cognitive processes were associated with better problem-solving performance. Haenilah, Yanzi, and Drupadi (2021) also concluded that scientific-approach-based learning activities improved early childhood problem-solving abilities.

Hands-on activities and play-based strategies support problem-solving development. Khan and Hussain (2024) found that hands-on learning for mathematical concepts increased engagement and thinking, indirectly supporting problem-solving. Play-based studies reveal similar outcomes: structured and unstructured play positively influence creative problem solving (Anonymous, n.d.). Morrison and Connor (2019) reported that play-based instructional strategies improve reasoning and problem-solving among preschoolers. Roskos and Christie (2018) highlighted that play-oriented activities enhance cognitive engagement and foundational problem-solving skills, while Hsin and Wu (2011) found that digital play activities contributed to enhanced problem solving through exploration and experimentation. Outdoor and inquiry-based play also fosters problem-solving and curiosity (Basaraba & Reeve, 2015). Fleer (2010) emphasized the role of guided and cultural-historical play as a mediating activity in developing problem-solving skills, and Weisberg, Hirsh-Pasek, and Golinkoff (2013) noted that guided play strategies support deeper engagement and enhanced problem-solving outcomes.

Collectively, these studies indicate that structured ABL activities are effective pedagogical approaches for developing problem-solving skills in early childhood learners. They provide

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strong evidence for integrating hands-on, collaborative, project-based, and play-oriented learning experiences in ECE curricula to enhance cognitive and problem-solving development.

Research Gap

Although international research provides evidences that ABL enhances problem-solving skills in early childhood, limited empirical studies exist within the Pakistani context, particularly in private early childhood education settings. Most existing studies focus on structured activity-based, project-based, or play-based learning models in international contexts, with minimal attention as to how ABL is implemented, and experienced by teachers in Pakistan. Prior research has largely emphasized quantitative outcomes related to children's cognitive development, while teachers' perceptions remain fully underexplored. There is also a lack of studies that integrate quantitative assessments of gaging children's enhancement in problem-solving skills through ABL, with qualitative insights from teachers for further improving these skills. Addressing these gaps is essential to develop context-specific strategies. This study addresses these gaps by employing a mixed-methods approach to examine both the impact of ABL on ECE children's problem-solving skills and teachers' suggestions for further improvement, in the context of private schools of Karachi.

Theoretical Framework

As per Constructivist Learning Theory; children actively construct knowledge through interaction with their environment. Learning occurs when learners engage in hands-on activities that involve exploration, experimentation, and problem-solving. ABL aligns with this theory by promoting meaningful learning experiences where children manipulate materials and solve real-life problems, thereby strengthening cognitive and problem-solving skills.

Sociocultural Theory emphasizes the role of social interaction, language, and guided support in learning. Vygotsky's concept of the Zone of Proximal Development (ZPD) highlights the importance of teacher scaffolding and peer collaboration. ABL supports this theory by encouraging cooperative learning, dialogue, and teacher guidance, enabling children to develop higher-order problem-solving abilities through shared learning experiences.

Conceptual Framework

The conceptual framework of this study illustrates the relationship between Activity-Based Learning (ABL) and the development of problem-solving skills among ECE children. In this framework, ABL serves as the independent variable, encompassing hands-on activities, play-based learning, collaborative tasks, and real-life problem-solving experiences.

The dependent variable is children's problem-solving skills, reflected through their ability to identify problems, generate solutions, make decisions, and apply reasoning strategies. Teacher facilitation, classroom environment, and learning resources act as mediating factors, influencing the effectiveness of ABL implementation.

The framework assumes that when ABL is effectively implemented with adequate teacher support and resources, it leads to enhanced cognitive engagement and improved problem-solving skills among ECE learners.

Research Methodology

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This study employed a mixed-methods approach to systematically investigate impact of activity-based learning on problem-solving skills in Early Childhood Education (ECE) children.

a. Research Design

The study employed a mixed method research design using a descriptive survey approach. This design was considered appropriate to collect data through closed-ended questions and to examine teachers' perceptions regarding the effectiveness of ABL in fostering problem-solving skills among ECE children.

b. Population

The population of the study comprised ECE teachers working in private schools of district East Karachi, who were involved in teaching children at the ECE level and implementing activity-based learning strategies.

c. Sample and Sampling Technique

The sample consisted of four private schools, with two ECE sections selected from each school, catering to children aged 3.5–4.5 years. A total of sixteen ECE teachers who used Activity-Based Learning were selected using purposive sampling. Ten ABL activities were purposefully selected to ensure relevance to problem-solving skill development.

d. Research Instruments

Quantitative data were collected using structured Likert-scale questionnaires to assess enhancement in children's problem-solving abilities before and after ABL interventions. While qualitative data were collected from teachers through a semi-structured questionnaire for the suggestions, to bring further improvements in the problem-solving skills of ECE learners.

e. Data Collection Procedure

Data were collected through the administration of questionnaires to the selected teachers involved in early childhood education in four private schools of district East, Karachi. Teachers completed the questionnaires based on their classroom observations and experiences during the implementation of Activity-Based Learning activities. The data collection process was conducted in a controlled and systematic manner.

f. Data Analysis Techniques

Quantitative data obtained from the Likert-scale responses were analyzed using descriptive statistics, specifically percentages, to summarize and interpret teachers' perceptions of the effectiveness of ABL in developing problem-solving skills. To develop comprehensive understanding, qualitative analysis of data was done through triangulation. It helped validate suggestions given by 16 teachers, for further improving the problem-solving skills among ECE learners.

Problem-Solving Activities

The schools designed ten structured ABL tasks to promote cognitive, logical, and socio-emotional problem-solving skills among ECE children. These ABL activities were conducted throughout the academic year in the ECE classrooms.

1. Shape Fit Challenge – Identifying appropriate shapes and matching them correctly.
2. Which One Is Missing? – Recognizing missing objects from a given set.
3. Object Sorting Problem – Classifying objects based on specific criteria.
4. How Many Are There? – Counting and verifying quantities accurately.

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5. Sorting by Size – Arranging objects from smallest to largest.
6. Emotion Problem Cards – Matching emotions to real-life situations.
7. Find the Hidden Toy – Using clues to locate a concealed object.
8. Clean-Up Challenge – Organizing materials and placing items correctly.
9. Lost Object Game – Locating misplaced classroom items logically.
10. Fix the Broken Toy – Reassembling simple toys to restore function.

The abovementioned activities targeted cognitive, logical, and socio-emotional domains, promoting active, hands-on engagement. Children participated in tasks such as the Shape Fit Challenge, identifying correct placements for geometric shapes, and Which One Is Missing?, detecting absent objects from a set. They were also engaged in Object Sorting and Sorting by Size, which developed classification and ordering skills, and How Many Are There?, enhancing counting and logical reasoning. Socio-emotional problem-solving was fostered through Emotion Problem Cards, where children matched emotions to situations, while strategic thinking and inference were encouraged in Find the Hidden Toy. Organizational and decision-making skills were reinforced through Clean-Up Challenge, observation and deduction through Lost Object Game, and analytical reasoning and practical problem-solving through Fix the Broken Toy. Collectively, these activities provided comprehensive opportunities for children to develop confidence, persistence, and problem-solving competencies across multiple developmental domains.

Results

Activity	Indicator	Pre (%)	Post (%)	Improvement (%)
1. Shape Fit Challenge	Identifies the problem	58	86	28
	Tries multiple solutions	52	81	29
	Shows confidence	55	84	29
	Persists	49	80	31
2. Which One Is Missing?	Identifies missing object	60	88	28
	Attempts multiple guesses	54	83	29
	Shows confidence	57	85	28
	Persists	51	82	31
3. Object Sorting Problem	Identifies sorting criteria	56	87	31
	Tries grouping strategies	50	82	32
	Shows confidence	54	85	31
	Persists	48	80	32
4. How Many Are There?	Identifies counting task	59	89	30
	Recounts	53	84	31
	Shows confidence	56	86	30

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	Persists	50	81	31
5. Sorting by Size	Correct size order	57	88	31
	Attempts multiple arrangements	52	83	31
	Shows confidence	55	85	30
	Persists	49	82	33
6. Emotion Problem Cards	Identifies emotion	55	87	32
	Attempts options	50	82	32
	Shows confidence	53	85	32
	Persists	48	81	33
7. Find the Hidden Toy	Identifies hidden toy	54	86	32
	Tries strategies	50	83	33
	Shows confidence	52	84	32
	Persists	47	81	34
8. Clean-Up Challenge	Identifies location	56	88	32
	Attempts arrangements	52	84	32
	Shows confidence	54	85	31
	Persists	49	82	33
9. Lost Object Game	Identifies misplaced object	55	87	32
	Attempts multiple locations	51	83	32
	Shows confidence	53	85	32
	Persists	48	81	33
10. Fix the Broken Toy	Identifies reassembly	54	87	33
	Tries multiple ways	50	83	33
	Shows confidence	52	85	33
	Persists	48	81	33

Results of Activity-Based Interventions

Assessments were done using a five-point Likert scale. Percentage-based comparisons revealed improvements across all indicators of problem-solving.

Activity 1: Shape Fit Challenge

Post-intervention results indicated substantial improvement, with children demonstrating increased ability to identify correct shape placement (58% to 86%), attempt multiple solutions (52% to 81%), exhibit confidence (55% to 84%), and persist with challenging tasks (49% to 80%). Improvements ranged from **28% to 31%**, reflecting enhanced cognitive engagement.

Activity 2: Which One Is Missing?

Children's ability to identify missing objects improved from 60% to 88%, while confidence and persistence increased by approximately **28% to 31%**, indicating significant gains in observational and logical reasoning skills.

Activity 3: Object Sorting Challenge

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Results showed marked improvement in classification skills, with correct identification of sorting criteria increasing from 56% to 87%. Overall gains ranged from **31% to 32%**, highlighting strengthened strategic thinking and task persistence.

Activity 4: How Many Are There?

Children demonstrated improved counting accuracy and logical reasoning, with post-activity scores reflecting gains of **30% to 31%** across all indicators.

Activity 5: Sorting by Size

Post-activity results revealed improvements of **30% to 33%**, indicating enhanced ordering skills, confidence, and perseverance.

Activity 6: Emotion Problem Cards

Significant gains were observed in socio-emotional problem-solving, with emotional identification and matching improving from **32% to 33%**, underscoring the effectiveness of the intervention in fostering emotional intelligence.

Activity 7: Find the Hidden Toy

Children showed improved strategic thinking and persistence, with gains ranging from **32% to 34%** across all assessed indicators.

Activity 8: Clean-Up Challenge

Organizational and problem-solving skills improved by **31% to 33%**, reflecting increased confidence and independent task completion.

Activity 9: Lost Object Game

Observation and logical reasoning skills demonstrated gains of **32% to 33%**, indicating consistent development in problem-solving behaviors.

Activity 10: Fix the Broken Toy

Indicators showed improvement of **33%**, highlighting strong gains in analytical thinking, confidence, and persistence.

Findings

The findings of the study indicate that activity-based learning had a significant impact on the problem-solving skills of ECE children in the cognitive, logical, and socio-emotional domains.

Across the ten structured activities, children demonstrated notable improvements in identifying and solving problems, attempting multiple solutions, showing confidence, and persisting with challenging tasks. For instance, in the Shape Fit Challenge, the ability to identify correct shapes increased from 58% to 86%, with confidence and persistence improving by 29% to 31%. Similarly, in Which One Is Missing?, children's observation skills and ability to detect missing objects improved from 60% to 88%, alongside gains in confidence and task persistence. Activities such as Object Sorting and Sorting by Size, strengthened classification, ordering, and comparative reasoning, with improvements ranging from 31% to 33%. Logical reasoning and counting accuracy increased substantially in How Many Are There?, with post-activity scores showing gains of 30–31%. Socio-emotional problem-solving also improved, which was observed in Emotion Problem Cards, where emotional recognition and situational analysis increased by 32–33%. Strategic thinking and inference skills were enhanced in Find the Hidden Toy, while organizational abilities and decision-making improved through Clean-Up Challenge. Observation, deduction, and task persistence were reinforced in Lost Object Game. The

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analytical reasoning and practical problem-solving showed notable gains in Fix the Broken Toy, with improvements of 33% across key indicators.

To enhance effectiveness of activity-based learning in ECE classrooms, teachers suggested few proposals. Training focused on planning, implementing, and assessing activity-based interventions be imparted to teachers, as their expertise directly influences student outcomes. A manageable student-teacher ratio, would allow individualized attention during problem-solving tasks. Parental engagement should be encouraged to reinforce problem-solving and socio-emotional skills at home. In order to develop detailed guidelines and standardize its implementation, policy-level support is essential.

Overall, results suggest that activity-based interventions effectively foster holistic problem-solving competencies, including cognitive reasoning, confidence, persistence, and socio-emotional understanding, in ECE learners.

Discussion

The findings of this study highlight effectiveness of ABL in fostering problem-solving skills among ECE children in private schools located in district East, Karachi. Across ten structured activities, children demonstrated notable improvements in cognitive, logical, and socio-emotional domains, highlighting the multidimensional benefits of hands-on, play-based learning experiences. Activities such as Shape Fit Challenge, Object Sorting, and Sorting by Size enhanced classification, analytical thinking, and comparative reasoning, reflecting significant gains in cognitive problem-solving skills. Likewise, tasks like Emotion Problem Cards and Find the Hidden Toy promoted socio-emotional development, including emotional recognition, strategic thinking, and persistence, emphasizing that problem-solving in early childhood is not limited to cognitive skills but it also involves social and emotional competencies.

Teachers gave few suggestions to enhance effectiveness of activity-based learning. Training on planning, implementing, and assessing ABL be imparted to teachers, because their expertise influences student outcomes explicitly. Manageable student-teacher ratio, allows individualized attention during problem-solving tasks. Parental engagement should be encouraged to reinforce problem-solving skills at home. Policy-level support is necessary to develop guidelines and standardized implementation mechanism.

These results align with prior research indicating that ABL encourages active engagement, motivation, and exploration, which are critical for developing higher-order thinking in young learners (Fleer, 2015; Higgins, Xiao, & Katsipataki, 2019). The study further demonstrates that children benefit from problem-solving experiences, as evidenced by improvements in confidence, persistence, and willingness to attempt multiple solutions independently. It was also determined that these activities help towards increased participation, enthusiasm, and growth in students' problem-solving abilities.

Overall, the discussion emphasizes that ABL is a holistic pedagogical approach that supports cognitive, social, and emotional development simultaneously. Integrating ABL into ECE curricula provides young learners with foundational problem-solving skills, preparing them for future academic challenges and fostering lifelong critical thinking and creativity.

Conclusion

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The study demonstrates that activity-based learning is an effective pedagogical approach for fostering problem-solving skills among ECE children in private schools of district East, Karachi. Assessment of the implementation of ten structured activities revealed significant improvements in children's cognitive, logical, and socio-emotional abilities. Children not only developed enhanced reasoning, classification, and analytical skills but also exhibited increased confidence, persistence, and willingness to explore multiple solutions independently. Socio-emotional competencies, such as recognizing and responding to emotions appropriately, were also strengthened through context-based problem-solving tasks. The findings highlight that hands-on, collaborative, and play-oriented learning experiences promote holistic development.

Moreover, the study emphasizes that training on planning, implementing, and assessing ABL be imparted to teachers, as their expertise directly influences student outcomes. Manageable student-teacher ratio may be maintained for individualized attention during problem-solving tasks. Parental engagement should be encouraged to reinforce problem-solving skills at home and policy-level support is necessary for developing guidelines and standardizing implementation mechanism. On the whole, integrating activity-based learning into ECE curricula can significantly enhance children's early cognitive and socio-emotional development, preparing them for future academic challenges and fostering lifelong problem-solving abilities.

Recommendations

Based on the findings, several key recommendations are proposed to enhance effectiveness of activity-based learning in Early Childhood Education classrooms. Structured ABL activities should continue to be integrated into the ECE curriculum to promote cognitive, logical, and socio-emotional development. Teachers should receive training focused on planning, implementing, and assessing activity-based interventions, as teacher expertise directly influences student outcomes. Prioritizing a manageable student-teacher ratios, allowing individualized attention during problem-solving tasks. Parental engagement should be encouraged to extend learning beyond the classroom, reinforcing problem-solving and socio-emotional skills at home. Policy-level support is essential in order to develop detailed guidelines and standardize its implementation. Collectively, these recommendations aim to create an enriched learning environment that fosters holistic development and strengthens problem-solving competencies among young learners.

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