4

Enhancing Pre-Numeracy Readiness of Preschool Children

Reetu Chandra*

Abstract

In the process of acquiring new information, cognitive skills help children think critically and creatively thus, solving problems. Preschool is the right place to begin by providing such input to young children. These inputs are vital to the development of pre-numeracy competencies called pre-numeracy readiness among preschool children, necessary for improving learning outcomes in mathematics in schools. These also help increase children's participation in school, strengthen retention, and thus ensure success in school. Realising the significant role of pre-numeracy in preschool children for their future learning and development, a study was conducted in preschools of four Municipal Corporation of Delhi (MCD) schools. This study intended to find out the existence of pre-numeracy competencies in the curriculum and among children. For this purpose, curriculum content analysis, classroom observation, and assessment of the level of pre-numeracy competencies among 82 preschool children were done to identify the learning gaps. To address the identified gaps, a set of activities were suggested to be included in the curriculum. The data was collected by the use of an observation schedule, a checklist to review curriculum content, and a school readiness instrument. The classroom observation suggested that though the curriculum contained some of the pre-numeracy activities in practice, such activities were rarely conducted. Gap analysis suggested that the majority of children were weak in the field of relative comparison: number-greater/ lesser followed by making different patterns using different shapes, understanding pre-number concepts, identifying sequence and describing in words and understanding the concept of space. This study has the potential to identify the gaps in pre-numeracy readiness among preschoolers and provide possible solutions to address these issues at a large scale.

*Assistant Professor, Department of Elementary Education, NCERT, New Delhi

Introduction

School readiness refers to the child's attainment of a certain set of skills and competencies under different domains of development such as physical, socio-emotional, language and cognitive. Children, who are weak in these skills and competencies are more likely to fail and eventually, drop out of school; get into trouble with the law; and have emotional difficulties, often leading to low-wage jobs, unemployment, and welfare dependence (CDPHE & CDHS, 2004).

According to Janus and Offord (2007), cognitive skills, reflecting an array of experiences in the early years, help make children ready to acquire new knowledge and information. Through cognitive development, children learn to observe, note similarities and differences, solve problems and ask questions (Mathematical knowledge and Abstract thinking). According to Naudeau et al. (2011), cognitive development indicators include problem-solving skills (for example, stacking and nesting objects), memory, and early numeracy skills (for example, sorting objects and knowing what is meant by 'one' or 'two' of something). As children near school age, indicators include knowledge of letters and numbers, the ability to retain information in short-term memory, and knowledge of key personal information like one's name and address. In Argentina, one year of pre-primary education/ECE (Early Childhood Education) was estimated to increase the average third-grade test scores in mathematics and Spanish by 8 per cent. In Nepal, disadvantaged children attending pre-primary education/ECE recorded significant gains in cognitive development, with subsequent increase in enrolment and progression through primary school (UNESCO, 2011).

Therefore, gaining cognitive competence at the preschool level helps children understand pre-numeracy concepts thus ensuring that children are prepared. However, preschool centers, especially government schools, do not focus on the activities and opportunities related to building and strengthening these concepts and competencies among preschool children. A preliminary survey of MCD schools revealed a similar condition. Therefore, the researcher has conducted the present study to:

- find out the existence of activities related to the pre-numeracy competencies in the preschool curriculum of MCD schools; and
- identify the gaps in the pre-numeracy competencies among preschool children of MCD schools.

Methodology

The study was conducted in preschools of four randomly selected Municipal Corporation of Delhi (MCD) schools in

the South District of Delhi. This study intended to find out the existence of pre-numeracy competencies in the curriculum and among children. For this purpose, curriculum content analysis, classroom observation, and assessment of the level of pre-numeracy competencies among 82 preschool children were done to identify the learning gaps. The data was collected by using Observation Schedule, Checklist to Review Curriculum Content, and School Readiness Instrument.

Results and Discussion

The results of this study fall under two parts. The first part charts the existence of activities related to the pre-numeracy competencies in curriculum and in practice. The second part shows the gaps in the pre-numeracy competencies among preschool children of MCD schools. The results of the study are as follows:

Existence of Activities Related to the Pre-numeracy Competencies in the Curriculum and Practice

The curriculum review suggested that except for the activities related to the concept of 'space' and 'relative comparison', i.e., 'numbers lesser and higher', the curriculum has suggested activities under all the aspects like pre-number concepts, identification, differentiation, sequential thinking, classification/ sorting, matching, missing numbers, pattern making, problem-solving, etc. However, observation of all four classes suggested that in practice activities related to all the aspects of pre-numeracy concepts were not actually conducted in any of them. Occasionally, they conduct activities related to pre-number concept, classification and identification/ writing of numbers. Apart from the identification of alphabets, curriculum suggested writing of numbers. Activities related to pattern making and relative comparison were negligible. Teachers were seen giving children some kind of writing work. It was noticed that all the children carried copies and pencils in their bags. On asking, teachers informed that due to the parents' pressure they give them some writing exercises. They said if they don't assign such exercises, parents will think, nothing is happening in the class and teachers are not teaching.

The findings of studies on preschool education in India also supported the findings of the present study about the existence of pre-numeracy or cognitive readiness in curriculum and practice. In 2006, NIPCCD reported that majority of the centres in the country organised outdoor activities—activities related to fine muscle coordination, while the activities related to the pre-numeracy or cognitive and language readiness were rarely observed. Kaul and Sharma, in 2019, reported a similar situation in Andhra Pradesh, Assam and Rajasthan. According to

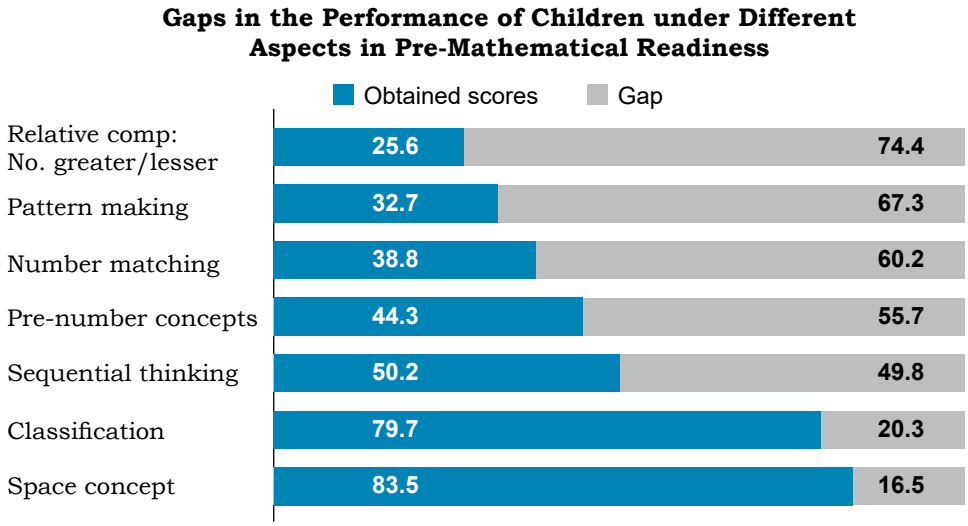

Figure 1: Gaps in pre-numeracy readiness of preschool children

them, activities for socio-emotional and cognitive development, and art and craft were only occasionally conducted.

Gaps in the Pre-Numeracy Competencies Among Preschool Children of MCD Schools

Gaps in the performance of preschool children were found in all seven aspects (100%) of pre-numeracy readiness. These gaps in scores ranged between a maximum of 74.4 per cent and to minimum of 16.5 per cent. As per the intensity of the gaps shown in the figure, the majority of children were weak in the aspect of relative comparison: number-greater/lesser with a gap of 74.4 per cent, making different patterns using different shapes (67.3%), matching numbers (60.2%), understanding pre-number concepts (55.7%), sequential thinking (49.8%), classification (20.3%) and understanding the concept of space (16.5%).

The findings of the study conducted by Bhise (2015) in her study in Maharashtra reported that in of 90 per cent preschool centres the quality of activities for pre-numeracy/ cognitive skills such as classification, seriation, reasoning, pattern making and sequencing were poor. She further reported that in 86 per cent of centers reading, writing and number work using formal, rote memorisation methods like copying from the blackboard, chart and textbook by the children was observed. In 79.50 per cent of centres no activities were conducted to develop readiness for reading, writing and number such as phonetics, sound visual association, the odd man out, pre number concept, picture book reading, etc., where as

in only 19.5 per cent of centres some readiness activities were conducted but only a few children were involved. The present study reported a similar situation in the preschools under MCD schools in Delhi.

Conclusion

The results revealed that, the preschool curriculum rolled out in preschools of MCD school of Delhi by the MCD administration suggested different activities for building and strengthening pre-numeracy competencies among preschool children such as, pre-number concept, identification, differentiation, sequential thinking, classification/ sorting, matching, missing numbers, pattern making, and problem-solving, etc. However, observations of sampled classes suggested that activities related to these competencies are not being carried out in the classroom. Assessment of the performance of pre-numeracy readiness of children also revealed heavy gaps in the readiness level of children under all seven competencies. Therefore, it is suggested that there is a need for intensive teacher training for preschool teachers. The focus of such teacher training should be on planning, developing, conducting, and evaluating the activities related to pre-numeracy competencies.

References

Bhise, Chhaya. 2015. *Effectiveness of Innovative Strategies in ICDS Centers for Quality Enhancement.* Unpublished Doctoral Dissertation, SNDT Women's University, Maharashtra.

Colorado Department of Public Health and Environment and Colorado Department of Human Services. 2004. *Colorado's School Readiness Indicators: Making Progress for Young Children.* State of Colorado, Colorado.

Janus, Magdalena and David R. Offord. 2007. 'Development and Psychometric Properties of the Early Development Instrument (EDI): A Measure of Children's School Readiness.' *Canadian Journal of Behavioural Science.* Vol. 39, No. 1. pp. 1–22.

Kaul, Venita and Sandeep Sharma. 2019. *Quality and Diversity in Early childhood Education: A view from Andhra Pradesh, Assam and Rajasthan Executive Summary Centre for Early Childhood Education and Development.* Ambedkar University. Delhi.

Naudeau, Sophie, Naoko Kataoka, Alexandria Valerio, Michelle J. Neuman, and Leslie Kennedy Elder. 2011. 'Investing in Young Children—An Early Childhood Development Guide for Policy Dialogue and Project Preparation, Directions in development-Human development.' The World Bank Group. The World Bank Publication, Washington DC.

National Institute of Public Cooperation and Child Development. 2006. *Three Decades of ICDS—An Appraisal.* NIPCCD, New Delhi.