Preparedness and Understanding Required for the Attainment of Foundational Numeracy in India

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Abstract

With the announcement of the National Education Policy 2020, several new structures and concerns in the Indian education system got highlighted. One such concern is on strengthening the mathematical abilities of citizens of India. The policy emphasises on the development of mathematical skills from early years onwards. This paper takes cognizance of the urgency related to the development of 'foundational numeracy' and proposes introducing 'bhaashayi ganit' in the foundational years. Talking mathematics in a contextualised manner through stories may help strengthen foundational literacy and numeracy. The article also shares the sensitivity required for understanding the term 'numeracy' beyond numerical know-how and its relevance in developing favourable mathematical dispositions..

Much of what we know from the status, challenges and quality of education in our country, it is evident that a lot of focus needs to be given to the foundational years of learning as many delicate shifts and linkages happen during these years. Many national reports and policies have expressed concerns in bringing young children to the school system, retaining their interest, and making curricular experiences meaningful for them. The report 'Learning Without Burden' (GOI, 1993) states that children were not 'dropping out' but were being 'pushed out' of elementary school due to disconnect between school curricula and real-life expectations. Although for the past few years we are witnessing an increase in the enrollment levels of children in the school systems (NAS 2017), we are far from sustaining their interest and achievement levels. Survey reports such as National Achievement Surveys (NAS) conducted by NCERT and the Annual Status of Education Reports (ASERs) have time and again reminded us of the low mathematical levels among our children. Far too many children either leave schools or fail to demonstrate basic competencies in mathematics up to Class 3. The National Curriculum Framework 2005 also remarked, "a majority of children have a sense of fear and failure regarding mathematics. Hence, they give up early on, and drop out of serious mathematics learning."

It is, perhaps, with this exigency that the newly announced National Education Policy 2020 (NEP) stresses on establishing strong foundational numeracy in the pre-primary and primary classes. It emphasises foundational literacy and numeracy as priority domains for smooth induction and continuation of children in the education system. It states, "the very highest priority of the education system will be to achieve universal foundational literacy and numeracy in primary school and beyond by 2025. The rest of this policy will be largely irrelevant for such a large portion of our students if this most basic learning requirement (i.e.,

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reading, writing, and arithmetic at the foundational level) is not first achieved" (MHRD, NEP 2020 p.8). The policy clearly holds foundational literacy and numeracy as building blocks for the academic success of the children.

In this paper, an attempt has been made to understand the term 'foundational numeracy' so that a holistic yet targeted approach can be adopted for attaining foundational numeracy among young minds, as expected in NEP 2020.

Wide spectrum of understanding foundational numeracy

Since there is no universally agreed definition attached to the term 'numeracy', the term attracts various viewpoints. This paper delimits its scope in detailing the varied viewpoints associated with the term 'numeracy'. However, some key references are stated here to give a glimpse of its wideness, scope and interpretation. Each explanation differs from the other minutely yet profoundly.

To begin with, we take the one which is used most widely. The Programme for International Student Assessment (OECD 2019) uses the following definition of numeracy as an objective while forming questions for their assessment tests, "Numeracy encompasses a range of skills from basic arithmetic and logical reasoning to advanced mathematics and interpretative communication skills." In most of the large-scale assessment documents and manuals, early numeracy skills are centred on the recognition of numbers, knowledge of counting and performing simple arithmetic operations of addition and subtraction. In this document, emphasis is given on the levels of attainment of numerical know-how by the end of pre-primary or primary stages.

Mathematics educationists take a much broader view of the mathematical proficiency that needs to be developed in the initial years. Several studies consider early numeracy beyond procedural numerical know-how. The fact that children may know counting but fail to apply them is an indication of poor mathematical proficiency. Knowing numbers alone with little understanding of the relationships that connect them is not of any use. Gelman and Gallistel (1978) were probably pioneers in listing the development of numbers, quantities and relations among young children. Children have innate abilities to counting. They build relationships among the sequence of verbalising number-names, one-to-one correspondence and the principle of cardinality. These relations are essential elements in the scheme of counting. Other researchers such as Butterworth (2005) and Durand et al. (2005) added that for school children, comparing the magnitude of different numbers also becomes a crucial aspect of mathematical ability. There are others, for example, Geary & Brown (1991) who purported that knowing number facts, establishing number relations and making associations between numbers contribute to the mathematical affinity of the children. Similarly, Nunes, Bryant, Sylva, & Barros (2009) advocate the establishment of logical thinking, understanding of conventional counting systems and making sense of simple number-word sequences in primary classes. They consider providing meaningful contextual learning experiences as the basis for the development of a child's early mathematical proficiency. And, others urge on the principles of logical thinking and relate numeracy to the child's growing abilities to understand and make relational statements among numbers (refer to Smith, 2002). They visualise the emergence of numeracy skills well before schooling and believe that these skills continue to develop and strengthen throughout life by a variety of informal and unstructured experiences.

Tracing footprints in earlier Indian policies

In the Indian education policies and commissions, the term 'foundational numeracy' first appears in the NEP 2020 but its need was felt long before. Although

the term doesn't come out in the earlier policies as explicitly as it does through the NEP 2020, the fact that basic mathematical proficiencies are a must to be acquired by all children up to a certain grade has been mentioned in the earlier policies as well. The tone of expression was, however, subtle and not so emphasising.

The National Policy of Education 1986 expressed concern on the inculcation of basic numerical knowledge at the primary stages. It stated that to achieve skill-based literacy, the curriculum of mathematics for primary school students must include numbers, four operations and basic geometry. Thus, basic mathematical abilities are subsumed under 'literacy'. Subsequently, the policy launched minimum levels of learning (MLL) to be achieved in one language (mother tongue), mathematics and environmental studies for Classes 1 to 5. These MLLs served as guidelines for teaching and learning at the primary level as they defined the minimum learning outcomes in the form of competencies to be attained by the end of a particular grade. Defining MLLs gave mandatory directions for ensuring the attainment of certain mathematical competencies. The competencies listed under MLL by the end of primary grades included identification of basic number sense, idea of quantification and geometric thinking. The aim of MLLs in mathematics was more towards strengthening the numerical procedural know-how in the primary classes. There was an emphasis on helping children perform basic arithmetic operations and recognition of shapes.

Under the National Curriculum Framework 2005, a dedicated document expressing the status and recommendations for teaching-learning mathematics was launched. In the Position Paper on Teaching of Mathematics, NCERT urged on shifting the focus of teaching mathematics from narrow goals, dominated by procedural know-how, to higher goals aiming at 'mathematisation' of a child's thinking. The emphasis was on achieving clarity of thought, ability to handle abstractions and adopting problem-solving (NCERT, 2006, pp.1-2). The framework suggested that children should understand the basic structure of mathematics, use abstractions to perceive relationships, visualise patterns, reason out things and argue the truth or falsity of mathematical statements. It also cautioned that having functional know-how in mathematics must not be taken as a goal of learning mathematics. Doing mathematics in the real spirit would encompass possessing the right attitude for problem-solving and systematically approaching it.

Adopting child-centred approaches for teaching basic elementary mathematics to young children was the prime agenda of this document. In primary and pre-primary classes, children must learn with concrete objects to understand the connections between logical functioning used in their everyday lives with mathematical thinking. Children must be led to making sense of numbers, use composition and decomposition methods to understand the structure of numbers, play with patterns, measurement and data handling to make a mathematical sense of things around them. The position paper had put strong emphasis on relating mathematics, at least at the primary level, to the social-cultural milieu of the child. Every child must be encouraged to look out for instances of doing mathematics around the child's surroundings, and also recognise that the non-formal ways of doing mathematics has substantial effects in reducing the fear of the subject. The curriculum should be enriched with a variety of activities, tasks, experiential anecdotes of using mathematics in everyday dealings. Accordingly, arithmetic operations should be introduced contextually to be followed by the development of language and symbolic notations to help the learners form a meaningful link. For introducing a sense for numbers, the Position Paper on Teaching of Mathematics (2006) iterates that children enter school with a set of intuitive and cultural ideas about numbers and simple operations. Therefore, at this stage

emphasis must be given to the development of numbers sense and skills of estimation and approximation instead of solely depending on standard algorithms of addition, subtraction. Teachers must begin by acknowledging the maths learnt by children from their out-of-school contexts.

Although in the Position Paper of Teaching Mathematics there is no explicit mention of the phrase 'foundational numeracy' or 'early numeracy', the recommendations made by the framework are in cognizance to the spirits of promoting a profound mathematical sense among the primary children. The suggestions made in the framework are elaborate enough to be taken as guidelines for encouraging young minds towards mathematics.

'Foundational numeracy' in National Education Policy 2020

The NEP 2020 is the first document that explicitly highlights 'foundational numeracy'. The second chapter of this education policy, titled, '*Foundational Literacy and Numeracy: An Urgent and Necessary Prerequisite to Learning'* draws attention to the urgency of promoting basic literacy and numeracy skills from the early stages of a child.

To understand what the policy means by 'foundational numeracy' we need to first dig out the essence of 'education' that the NEP 2020 conveys. The policy accentuates, "With the quickly changing employment landscape and global ecosystem, it is becoming increasingly critical that children not only learn but more importantly learn how to learn" (MHRD, NEP 2020, p.3). The purpose of education, therefore, must be to move towards minimally required content with the acumen to learn and think critically. It is imperative to strengthen the abilities to solve problems, be creative and work in a multidisciplinary manner. The policy envisions the citizens of India to be innovative, adaptive and creative to imbibe themselves to varied challenges of life. Such an aim can be achieved through a pedagogy that is driven by the tenets of experiential learning, holistic and integrated presentation, and is inquiry-based, discovery-oriented, learner-centred, discussion-based and flexible outlook.

Particularly for the learning of mathematics, NEP 2020 recognises mathematics and mathematical thinking as indispensable ingredients for the future of India. One will have to start thinking mathematically from early years onwards. This does not mean increasing the content of mathematics. It means promoting the competencies of logical thinking, computational skills, reasoning, argumentation and decision-making capacities. The policy recognises the need to sow the seeds of mathematical thinking from the foundational stages of a child.

The policy states that schools and ECCE centres have laid little emphasis on foundational numeracy. School curriculum moves so quickly for young learners that all the learning in schools gets limited to rote memorisation. Schools are providing mechanical academic training to the learners and have completely ignored the foundational material essential for learning (MHRD, NEP 2020, p.15). The policy suggests that the principle of learning mathematics must be to provide a solid foundation in counting, arithmetic, mathematical and logical thinking, problem-solving and being creative so that mathematical learning becomes more enjoyable for learners.

The policy urges ensuring attainment of 'foundational numeracy' by the end of the primary stage by all students. It states that to overcome the learning crisis happening in India, children need to be equipped with the concept of numeracy and literacy, which most children lack when they enter school. The ability to read and write, and perform basic operations with numbers are necessary and indispensable prerequisites for all future schooling and lifelong learning. Once a student falls behind on foundational numeracy, all other areas of mathematics suffer making it difficult for the learner to catch up later. The fear, at times, becomes so huge that it emerges as a major reason

for not attending school or for dropping out altogether.

Adequate preparation needs to be done to develop basic numeral skills in early childhood education. NEP 2020 proposes setting up a National Mission on Foundational Literacy and Numeracy by the Ministry of Education. The purpose of this body will be to identify stage-wise targets and goals to be achieved by 2025, closely tracking and monitoring the progress of the same and speeding up the entire process. Plans are being proposed to provide schools with an adequate number of local teachers or those who are familiar with the local languages so that the children can learn the language they are comfortable with. It also appeals for ensuring the pupil-teacher ratio to be under 30:1 so that teachers can focus on all the learners and can achieve the goal of foundational numeracy and literacy well on time and in an effective manner. Some other ways for ensuring an early achievement can be one-to-one peer tutoring, which can be taken up voluntarily and as a joyful activity under the supervision of trained teachers. The policy recommends that if "every literate member of the community could commit to teaching one student/person on how to read, write, perform basic operations, it would change the country's landscape very quickly" (MHRD, NEP 2020, p.9). All the states and UTs are being suggested to establish innovative models to foster peer-tutoring and volunteer activities as well as launch other programmes to support learners in attaining foundational literacy and numeracy.

Explicitly addressing the concerns of foundational numeracy

Although the NEP 2020 recognises foundational literacy and numeracy as essential building blocks for a child's further attachment to school, both these terms need to be understood separately as the challenges and attainment of early literacy are quite distinct to those attached with early numeracy.

In terms of literacy, Ball, Paris, & Govinda's (2014) survey conducted on developing countries shares some significant insights related to the transition of children from their mother tongue to the language used for instruction in schools. They state that children who come from high-income or mid-income families face less trouble in making this transition. Children who have an environment of reading and writing at their home are already adequately acquainted with the acts of reading and writing before entering the formal school system. This means that such children do possess an 'orientation' towards the processes of formal reading and writing. Communities where children read storybooks or are engaged with the print media, may not face literacy issues.; The efforts are more with children who come from deprived sections. First-generation learners or children from print-deprived sections have to put in extra effort. These children get opportunities of getting 'orientated' to the simple acts of reading and writing only after they enter school. It is only after they enter the formal school structures that they get to avail the opportunities to 'start learning' to read and write. Thus, in terms of literacy, the social background of the children has a significant effect on the levels of attainment.

In terms of numeracy, the challenges of transition from out-of-school experiences to in-school learning are quite unique. During the pre-school stage, children gain experience in counting and familiarisation with number-words from their home. They get to know the counting skills, which become a quick and handy tool for doing simple addition and subtraction. However, to handle bigger numbers, the reliance shifts from counting to building a sense of numbers. This shift is the prime tenet of 'numeracy'.

Children gather simple traits of counting, adding and subtracting by observing their elders or by getting themselves engaged in everyday mathematically involving tasks. During the pre-school period, they get to learn a counting sequence. Based on it they

work with numbers. While being in school, the scope goes beyond simple counting techniques to familiarity with large numbers, which calls for a sophisticated numerical sense. For instance, children learn to recite number names through nursery rhymes. At first, they learn to pronounce number words rhetorically and gradually get familiarised with number words as an extension of their vocabulary. Through nursery rhymes, stories and songs, they learn to recite numbers in a sequence. 'One, two, buckle my shoe', 'ek, do, teen, char, aaj shani hai kal itwaar; paanch, cheh, saat, aath, yaad karoge saara path' (एक, दो, तीन, चार, आज शनि है कल इतवार; पाँच, छह, सात, आठ, याद करोगे सारा पाठ). 'Ten little fingers, ten little toes, Two little ears and one little nose'. While reciting number words, children get to know the sequence in which these need to be spoken. Then, there are incidental usage of numbers, such as 'how old are you', 'what is your house number' and such. Although such recitals may not contribute much mathematically, they help in remembering and recalling number names as a connected string of words. Later, these experiences contribute to the learning of counting.

One possible reason for low numeracy could be disconnect between number recitals and the essence of numbers. Children learn the skills of counting separately and their understanding of quantities and number relations is taken up independently. Children often learn numerical procedures without understanding their conceptual basis. Overemphasis on repetition of numbers without understanding the principles behind them leads to a dislike towards the subject from an early stage. Piaget's theories were centred on the premise that children develop an understanding of quantities and relations before knowing what a number is. He claimed that children's abilities to form logico-mathematical relationships become strong criteria for doing mathematics. According to Piaget (1976) and others, the development of logical thinking helps in the development of numbers. The principles of conservation of numbers, classification and seriation contribute to synthesising number sense.

Additionally, there are also social and cultural diversities that make the transition from out-of-school mathematics to school mathematics challenging. For instance, Walkerdine (1990) quotes how mothers of certain working-class families use the phrases 'more/no more' rather than 'more/less'. For this community, largeness in quantity is expressed in a contra-positive manner, indicating a negative association with the term 'more'. This example indicates that even in early mathematics, the term 'more', 'less', 'no more' can have different meanings for children. Often such subtle differences go unnoticed by curriculum makers who assume mathematics to be a 'culture neutral' subject. In the early years, mathematics seeps in through recreational engagements and by indulging in elementary computations in schools, there emerges a huge gap in experiences related to mathematics. Children's early understanding of dealing with numbers is grounded in their everyday experiences, gathered from their surroundings, interactions with adults and from their social and cultural contexts.

We, however, also know that mindless recreation of contexts and over-emphasis on activities in the name of providing concrete experiences also leads to a detachment to the subject (Gandhi & Garg, 2018). Concreteness may not always lead to meaningfulness. Often it is observed that the games and activities undertaken in the primary classes add little to the development of disciplinary aspect. In the name of 'enjoyment', the essence of mathematical thinking gets distorted. "The teaching of mathematics has to be such that ideas and concepts, even though they can, to begin with, be related to the experiences of the child and are useful in the transactions of daily life, must move away from everyday experiences as the ideas themselves are inherently abstract and ideal constructs" (Dewan, 2019). School mathematics is not the same as home mathematics. Efforts will have to be made to put abstract mathematical

ideas in easy-context driven situations, but with extreme caution to not dilute the mathematical essence while doing so.

Thus, in the early years, the transition from the way mathematics is done at home to the way it is dealt with in schools has to be handled with utmost care and sensitivity. This transition has been universally identified as a tumbling stage for many young children. Rampal & Subramanian (2012) accepted that designing elementary mathematics curricula for schools, in as diverse and iniquitous circumstances as is in India, is indeed a challenging task. Further, a large number of our children enter school not being familiar with the formal instructional language owing to which they struggle to meet the basic numeracy levels. The language used in school mathematics is quite distinct from that used in daily dealings (Dewan, 2019). We have to be sensitive to the language and the cultural aspects of the child, but along with umpteen dedications will have to be given to strengthening the epistemic roots of the subject.

Bhaashayi ganit (भाषाई गणित): A promising pedagogy for foundational numeracy and literacy

We agree that the seeds of thinking mathematically get sown at the pre-primary level. It is, therefore, important to understand what initiating reasoning abilities in young minds means and the pedagogy that may help in doing so.

Nunes, Bryant, Sylva, & Barros (2009) consider mathematical reasoning as a fundamental trait for better mathematical development. "Mathematical reasoning, even more so than children's knowledge of arithmetic, is important for children's later achievement in mathematics". They distinguish arithmetic and reasoning in the following way. Arithmetic or numerical ability, according to them, is 'learning how to do sums and using this knowledge to solve problems; whereas, mathematical reasoning is 'learning to reason about the underlying relations in mathematical problems they have to solve' and can include both additive and multiplicative reasoning. Promoting reasoning about mathematical relations should be the goal of the primary school curriculum. This conceptualises that mathematical development at early stages is not limited to dealing with numbers alone. It encompasses relations between numbers, processes of approximation of space, comparison of magnitudes, logical connections of statements and dealing with symbols. There is no doubt that processing numerical information is potentially crucial for the early development of mathematical abilities, and along with this, domains of handling shapes, space and quantities, and relations must be given due importance.

Although during the early stages children may not delve into rigorous reasoning skills, they must be inducted to perceive elementary connections between mathematical ideas and facts. At this stage, mathematical reasoning would implicate acts of confirming, reconstructing, generating, and reorienting. So, the teachers may ask children to confirm their responses and help children recognise the correct phenomenon. Even an act of agreement confirms the validity of the procedure. Reconstructing may involve relooking at things by paying attention to facts such as, when a child confirms 26 + 9 is 35, the child may be asked to solve (26 + 10) - 1 without doing any calculations, as a follow-up. This would involve noticing facts that were not noticed earlier. Similarly, in the acts of generation and reorientation, children can be led to investigate more facts and properties such as, will the shape change if its orientation is changed, or completing an incomplete figure, or co-joining shapes to create a new shape. Activities related to composing and decomposing shapes, as well as numbers, also prove fruitful.

A crucial point that needs to be mentioned here is that no reasoning can be initiated in a silent, non-participatory class. Children must be encouraged to talk mathematics from their early stages itself. At the foundational

stage, a lot of emphasis must be given to verbal mathematics or '*bhaashayi ganit*'.

Let me explain what I mean by *bhaashayi ganit* and how it can help in building a strong mathematical foundation at an early stage. First, the phrase should not be taken as a synonym or alternative to 'oral mathematics' or मौखकि गणति. Oral mathematics tends to get procedurally oriented. Often when teachers are asked to do oral mathematics in their classrooms, they tend to regard it as an alternative to written practice work. Children are seen doing the same work, which they would otherwise be doing in a paper-pencil environment. Oral mathematics is misunderstood for practicing sums quickly or for speaking out the memorised facts. Such practices need to be discouraged. Instead, we want our children to speak out their thoughts. We need to encourage our children to share their work, speak for themselves and participate as active actors. Children have great imagination powers and these must be strengthened in young years. Let children speak their mathematics. Instead of writing mathematics, children at the foundational stage must be encouraged to do mathematics by talking and imagining. For example, while listening to the story of three bears, children build imaginative figures of the bears, their sizes and three-ness. Many mathematical talks can be initiated within the story, such as comparing the shapes and sizes of the father-bear/child-bear to themselves, drawing the three bears, pretending to be the three bears and discussing the portion of food they would eat, laying the table for food and such. Let them perceive the connections between numbers and shapes and the world around them. Children must be able to look at the mathematical facts in an open environment with scope for talking and expressing themselves. van Oers' (1996) suggests that asking simple questions like "are you sure?" proves to be a powerful route for encouraging thinking in young children. Questions like "is this right", "how did you get this", "can you do it again", "what happens when I break this apart/ put these together", "how do we compare these two", "what is the smallest part/unit", "do you see anything repeating" help in reconfirming, reconstructing and generating relationships. In addition, open-ended talks at home and at school have the potential to increase the thinking abilities of children. In other words, when children get opportunities to speak and talk mathematics, they tend to learn better.

Imbibing *bhashaayi ganit* is a lot of work. It calls for an overhaul of orientation to our perception of teaching mathematics, especially at the foundational stages. Teachers as well parents will have to learn to 'talk mathematics'. A lot would depend upon them. Elders must start trusting the young minds. Listen and interpret what they are saying. Teachers must be oriented to initiate math talks with the young minds. Teachers at the foundational stage will be required to show both mathematical knowledge and an open attitude to listen to children. This calls for a change in the mindset of the teachers and parents. Widespread series of workshops and training programmes will be needed to induct elders (both teachers and parents) to accept the voices of young minds. They need to be oriented to listen and pose valid open questions to the children. Teachers and parents will have to be prepared to hold mathematical discussions with children.

It is hypothesised that *bhashaayi ganit* will provide a source for strengthening both, foundational literacy and foundational numeracy as children will speak and do mathematics. By verbalising their ideas in their own local language, children will gain confidence to talk aloud rather than getting burdened by the pressure of using correct, formal language. Use of local stories embedded within the local context in local language should be the key to *bhashaayi ganit*. Inculcating a habit of thinking, speaking and talking mathematics from an early stage will, in due course, develop into strong reasoning abilities. *Bhaashayi ganit* will also support aspects of experiential learning, visual thinking and development of good communication skills, which have

been termed as non-negotiable aspects of education in the NEP.

A need for teachers' orientation and preparation

Attaining foundational numeracy is incomplete without attending teacher education. The policy recommends constant support with the continuous professional development of teachers to impart foundational numeracy and literacy. The curriculum for primary teachers' education will have to be relooked to ensure inclusion of concerns and challenges related to foundational numeracy and literacy. Teachers' preparation and development programmes must cover updated pedagogies related to foundational numeracy and literacy. Of course, experiential learning, multilevel activity-based learning, cultural integration and using storytelling-based pedagogies will be an integral part of such curriculum. Challenges related to both literacy and numeracy in basic years will have to be looked at in tandem. The curriculum must be drawn from the researches done in these areas to help teachers understand the finer nuances in achieving foundational numeracy. There is a severe need to study the concept of foundational numeracy, its relevance in developing countries like ours. It would mean critically looking at certain existing pedagogies of early mathematics such as holding mindless activity-based classrooms, and overemphasis on recitation of number names. Teachers at this level will have to understand the challenges related to early education, handling transition from home-mathematics to school-mathematics, and incorporate 'discipline-oriented' early-childhood pedagogies.

There is also a need to bring out a focussed map of building foundational numeracy and literacy from the early stages, beginning from Early Childhood Care and Education. NEP 2020 envisages that before the age of five (that is, before entering Class 1), every child should attend 'Preparatory Class' or '*Balvatika*', which would have ECCE-qualified teachers (MHRD, NEP 2020, pp.7-8,). Teachers engaging at this level will have to undergo training relevant to handling very young children. It attempts to prepare an initial cadre of high-quality ECCE teachers in Anganwadis by training them through a systematic effort following the curricular and pedagogical framework. "All the Anganwadi workers who have qualified their 10+2 and above will be given a 6-month certificate in ECCE, and those with lower educational qualification will be given a one-year diploma covering early numeracy and literacy" (MHRD, NEP 2020, p.8).

NEP also recommends creation of a national repository of high-quality resources on foundational numeracy. These resources will be available to teachers on a single platform, Digital Infrastructure for Knowledge Sharing (DIKSHA). Technological aids will serve as an important medium to overcome the language barriers while acquiring foundational numeracy. Along with the national repository, the onus of creating learning resources should be shared with local teachers. Teachers should be encouraged to prepare resources keeping in mind the local needs, learner's need, and availability of resources in their schools. Local teachers should be encouraged to prepare their own resources as per their learner's need and context. Focus should shift from developing readymade materials to preparing contextualised content and material. In addition, the potential of community radio may be harnessed for connecting with the community.

NEP also encourages building school clusters for better management and sharing of resources. The scope of school clusters must be expanded to foundational years. Anganwadis, ECCE centres must be made part of school clusters of their region so that there is a smooth transition of content and pedagogy from pre-primary to primary and formal schooling. Likewise, the schools will get connected to the local needs ensuring no lapse occurs in the transition of children

across grades. Local schools and pre-primary centres can be affiliated to school clusters to share the responsibilities, and the existing schools can mentor these local schools. Pre-primary school clusters will help develop an effective social and emotional ecosystem for the child.

There is also a need to make an elaborate teachers' manual rather than textbooks. Manuals must talk about ECCE teachers' beliefs and mindsets, working skills, dealing with young minds, and creating sensitivity towards local issues. Since in the early stages most of the experiences are gained through local, community-based milieu, teachers' recruitment and training must also be the responsibility of the states/ zones and if possible, of panchayats. While preparing teachers, there is a need to focus on promoting multilingual instructions so that the prospective teachers can easily acquire the language of their learners.

NEP makes a strong appeal for improving the mathematical abilities of people right from early childhood. The intent will be successful if the approach taken in achieving the goal is more holistic. A lot of work in terms of teacher's preparation, parents' outlook and on early mathematics pedagogy needs to done. Educational institutes need to encourage good maths researches in understating and implementing foundational numeracy in our country. The approach taken to do so must not be centred on strengthening the numerical abilities alone. Early numeracy must be seen as a subset of early mathematics cognition.

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