

Mathematics in NEP 2020: Initiative to Strengthen Foundational Literacy and Numeracy Skills

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Abstract

Teaching learning of Mathematics has, since long, been a challenge to both students as well as teachers. The way Mathematics has been taught in the classrooms has somehow failed to yield desired results. It is generally seen that students are unfamiliar with basic concepts and skills in mathematics as well as in language even after the completion of primary education. This learning crisis in Indian schools is affecting students' annual academic performances and future prospects. Research on such issues has brought forward proposals for competency based learning which also find place in the new National Education Policy (NEP) 2020. NEP 2020 advocates that the student should be strong in foundational skill in language and numeracy along with 21st century skills such as soft skills, problem solving skills, communication skills, high order cognitive skills etc. NEP 2020 has emphasized on making the students proficient in Foundational Literacy and Numeracy (FLN) skills till the age of 9 years by taking the foundational stage prominently and dividing it into the categories of pre-primary and primary. The presented article discusses the importance of FLN at the primary level and how this initiative is progressing amid the NEP 2020 proposals in the form of NIPUN Bharat Mission which aims at universal competency in FLN.

Key Words: Primary Education, Learning Crisis, Foundation Literacy and Numeracy (FLN) skills, NEP 2020 and NIPUN Bharat Mission

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Introduction

Education is an important vehicle for individual and societal development. Faulty education hampers development. Our education system today requires an overhaul. The procedure of having written examination is considered a vital component in the Indian education system. To secure a pass percentage in these exams, students often resort to rote memorization without trying to gain a conceptual understanding of the subject. The report card may show a decent position in school or in board results but this learning will not be worthwhile in real life. The new National Education Policy has come up with new ideas to address such issues. The new policy known as NEP 2020 recommends 5+3+3+4 structure instead of conventional 10+2 school system. In this new composition, three years of anganwadi or play school will be added to twelve years of regular schooling as children's age of 3-6 years are vital for the advancement of mental capabilities.

There are two divisions in this foundational Stage, as recommended in the NEP 2020. The first part comprises of 3 years of play schooling and second segment consists of primary classes- grades one and two only. In this, play way or activity based multi-level learning will be the pedagogical means to build robust foundational literacy and numeracy skill. NEP 2020 has considered play school or anganwadi within formal school system. The remaining ten years are preparatory stage (grades III to V), middle school (grades VI to VIII) and secondary stage (grades IX to XIII) till 18 years of age. The purpose of this change at the grass root level is to focus on Foundational Literacy and Numeracy (FLN) skills. Though investing in FLN might increase the cost of education but it is necessary to improve the quality of education. FLN in primary education is needed to upgrade inclusion of appropriate skills in language and in mathematics, to increase the learning level of students and to decrease dropout rates in and after primary schooling.

LEARNING CRISIS

According to World Bank, illiteracy of early years gives rise to Learning Crisis which gradually turns into Learning Poverty (World Bank, 2019). Learning poverty explains illiteracy in terms of percentage of 10 year old children who are unable to read and understand simple written texts. It is believed that up to class four, students should have proficiency in foundational skills in numeracy and literacy both (Belafi et al., 2020).

As per the National Achievement Survey (2017)*, primary students have poor reading skills. One in every three students who are in grade three are unable to read their text books with comprehension.

Similarly, one out of every two students of grade three cannot solve their daily life mathematical problems. ASER report (2018) showed that hardly 50 % students of grade five are able to read simple text of grade two level. Only 43% students of grade eight solve arithmetical questions at grade five level and likewise merely 28% students of grade fifth students are able to solve questions based on division operation. Such kind of reports illustrate learning crisis in the early years of school system. The text books are designed according to nation's curriculum frame work. There is an expectation from students that they have attained grade level skills to progress upwards. Students who fall behind as per expected learning outcomes or sitting in same classroom for more than a year stay behind in the education sphere. Learning crisis produces flat learning profiles and inequality within the student community across the country. 55%** of Indian students at late primary age are facing learning poverty.

Students are expected to learn to read till grade three, after which, the habit of 'reading to learn' can be developed in the students. According to the Mathew Effect of psychologist Keith Stanovich, **'Those who stay behind are left behind'** (Kempeet al., 2011). Due to the large number of learning gaps, the problem of reading in the stage **'read to learn'** also creates problems in other subjects and gradually the students come in the backbenchers' category in the school. Finally, they leave schools very early in comparison to their peer group. The problem of dropping out of school gets worse. In contrast, the habit of reading and reading with comprehension, and writing inspires new reading, which certainly leads to becoming a lifelong learner over a long period of time.

It is difficult to build a house without a strong foundation, in the same way, without a strong foundation of learning in the primary grades, the best outcomes of learning cannot be imagined. Since, FLN skills (foundation literacy and numeracy skills) are a key to unlock the door of complex ideas and vocabulary; they are building blocks of learning in higher grades and have long term impact on the ensuing years of life.

To remove obstacles and to achieve strong foundational literacy and numeracy skills at primary level, NEP 2020 points out, **'the rest of the Policy will be largely irrelevant for such a large portion of our students if this most basic learning (reading, writing, and arithmetic at the foundational level) is not first achieved'**. To get maximum benefit from schooling, the NEP 2020 advocates that the early childhood education should make sure that children are "school ready". The target of high quality Early Childhood Care and Education (ECCE) has to be achieved by 2026-27.

FOUNDATIONAL LEARNING

The fourth goal among the Sustainable Development Goals (SDG4) speaks about quality education, **"Ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy"** (United Nations, 2016).

In the field of education, emphasis was laid on girl education, inclusive education, technical and vocational education, etc. (which is correct) but somewhere students' basic numeracy and literacy skills have been left far behind, and this is a matter of great concern. The first step of formal school system is Primary Education (PE). PE is the necessary base and an imperative condition to move in the upward direction towards secondary education as well as tertiary education. In primary education, students develop the required skills to read and write simple text along with proficiency to solve numerical questions based on basic four mathematical operations.

The literacy and numeracy skills are constituents of various other skills and are also known as foundational skills. These skills help students to think creatively, analyze critically and facilitate the unlocking of higher order skills. Moreover, they also strengthen the students' ability of making meaning in different context. The sturdier the grip of literacy and numeracy skills at ECCE level is, the more successful the entire educational system will be. Indeed, it is a precondition of all area of learning and future schooling. In other words, FLN skills enable students to understand other subjects of the curriculum easily. One of the main objectives of education is to enable one to get appropriate employment for livelihood. FLN skills help to achieve this objective.

PISA (Program for International Student Assessment) has defined literacy and numeracy as **"Literacy (or reading literacy) is the capacity to understand, use, and reflect on written texts in order to achieve one's goals, develop one's knowledge and potential, and participate in society. Numeracy encompasses a range of skills from basic arithmetic and logical reasoning to advanced mathematics and interpretative communication skills."** (Ball et al., 2014)

Literacy skills help students to acquire the skills used in reading, writing, speaking and listening. Numeracy assists to cognize basic operations with numbers. Numeracy is needed to understand and solve the

mathematical challenges of life including time, patterns, shapes, measuring units etc. FLN skills help to understand higher order operations in mathematics and beyond. Deficit in FLN skills increases the dropouts in primary classes while mastery in FLN skills may help to stay in schools for longer duration (Zuilkowski et al., 2016).

NIPUN BHARAT MISSION

NIPUN*** Bharat Mission was launched on 5th July 2021 keeping in view the guidelines of NEP 2020. It is a part of Samagra Shiksha Programme. Its vision is that all children of grade three are able to achieve desired learning competencies by 2026-27. After grade four, no student should be left behind in FLN skills. Such abilities of students help in building knowledge based progressive society. The formative years at school provide a credible basis for adapting numerous real-world situations, so the NIPUN campaign aims to create an educational environment to achieve comprehensive FLN skills by 2026-27. It covers the learning abilities of children up to 9 years of age. Reading comprehension, writing and articulation of ideas are considered essential criteria in the context of language. Oral language development, phonological and print awareness, decoding, vocabulary, reading comprehension and fluency, writing are basic constituents of the desired learning outcomes for foundation language and literacy. Key elements of foundational literacy are:

- Read with comprehension
- Listening and speaking with understanding
- Readiness to read for a variety of purposes

Mathematics introduces essential skills and thinking strategies to be used in life. It helps in understanding of numbers, shapes, patterns and the way data is handled in routine manner. It includes clarity in pre number concept, good mathematical vocabulary and visualization. Main components of foundational numeracy consists of:

- Understanding of Numbers
- Counting Capability
- Development of Number Sense
- Active mathematical thinking

The structure of NIPUN Bharat mission has been prepared after in-depth consultations with experts from State and Union Territories keeping in mind the national and international studies. In this, both the administrative and technical levels have been given prominence. Emphasis has been laid on establishment of effective mechanisms not only at school but also at block, district, state and national level so that appropriate changes take place at administrative and technical levels. To strengthen FLN skills, few strong steps are recommended, such as pedagogy to be based on experiential and play way methods, learning resources should be prepared at the local level as per the national guidelines, critical mathematical thinking should be developed and along with formative assessment, there should also be a provision for adaptive assessment.

MAJOR OBJECTIVES OF NIPUN BHARAT MISSION PROGRAMME

- To make classroom environment inclusive, based on physical activity as well as discovery learning in pedagogical skills, language of the child and linkages of daily life.
- To make students independent and motivated writers and readers to develop their enduring reading and writing skills.
- To make students reasoning proficient in the areas of numbers, sizes and shapes.
- To develop problem solving skills independently with an understanding of numeracy and spatial understanding.
- To ensure the availability of effective learning materials that are culturally useful.
- To conduct a continuous capacity building program for all the people associated with the education sector.
- To engage all the stakeholders in the tradition of lifelong learning.
- To include projects, games, portfolios, group and collaborative work etc. in teaching - learning to ensure comprehensive evaluation.

To serve the objectives of holistic development of children, emphasis is laid on their good health and well-being (HW) as well as making them effective communicators (EC) and involved learners (IL), so that they

feel connected to their immediate surroundings. In the context of FLN skills, what should be the achievements of the students from Bal Vatika to Class III, the exact details have also been laid down.

Conclusion

The basic objective of education is to ensure learning for all children; NEP 2020 has suggested a clear path which will inculcate conceptual clarity as well as creativity and critical thinking in students from the very beginning years of childhood. Students capable of FLN skills will be able to understand different aspects of classroom transactions, which in turn, will prove to be helpful in achieving the learning outcomes of primary, secondary and senior secondary grades at school level. The dropout rate at the primary stage will be low and the completion rate of schooling at the secondary level will be high. Surely, it will be a productive contribution towards the society. There is an effort to make India self-reliant, by helping children, who are the future leaders of the country, to awaken their abilities to their full potential.

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**<https://pubdocs.worldbank.org/en/386361571223575213/SAS-SACIN-IND-LPBRIEF.pdf>

***NIPUN – National Initiative for Proficiency in reading with Understanding and Numeracy