

FOUNDATIONAL LITERACY AND NUMERACY ASSESSMENT

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Abstract

The early years of development of a young child is a period of rapid brain development. According to research, a child's brain develops between 80 and 90 per cent by the time they are between 6 and 7 years old. As a result, one of the most important indications for creating productive and effective human capital is placing a heavy emphasis on setting a solid foundation for better growth, development, and learning in the early years. Achieving fundamental reading and numeracy abilities has also been given the utmost importance in the National Education Policy, 2020, which unequivocally acknowledges that the remainder of the policy will only be meaningful for the children if the most fundamental learning needs are met. In this essay, a software assessment is provided for the pupils to measure them against the benchmarks for foundational reading and numeracy skills defined by the Ministry of Education's Department of School Education & Literacy. The total number of students who failed the test can be utilised by administrators and decision-makers in the field of education to raise the standard of instruction in each of their administrative regions. This standard national assessment will promote uniformity in the educational objectives, thus in the education model.

Keywords - Foundational Literacy and Numeracy (FLN), National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN Bharat), National Education Policy 2020 (NEP), Annual Status of Education Report 2018 (ASER).

I. Introduction

The National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN Bharat) was started by the Ministry of Education to make sure that every student in the nation possesses FLN (Foundational Literacy and Numeracy) by the end of third grade. The National Mission, which has been started under the auspices of the federally funded Samagra Shiksha programme, will concentrate on giving children access to and keeping them in school while developing high-quality and interesting learning resources for students and teachers, boosting teacher capacity and monitoring each child's progress toward educational goals.[2] The Ministry of Education (MoE) will establish an organisation, which will be headed by a Mission Director chosen by the Center.[1] The target audience is kids from preschool to grade three who are between the ages of 3 and 9. Age-appropriate and supplemental graded learning resources, peer assistance, personal mentor help, and guidance will be given to the Class 4 and Class 5 students who have not yet mastered the fundamental abilities. All governments, government-aided institutions, and private schools must fulfil the mission's aims and objectives in order for FLN skills to be acquired by everyone by 2026–2027[3][4][5].

The Foundational Learning Study (FLS), which involved about 86,000 third-graders from 10,000 schools, was carried out in 2022. State government schools, government-aided schools, privately recognised institutions, and central government schools were all represented in the study samples. Twenty languages were utilised in the FLS,

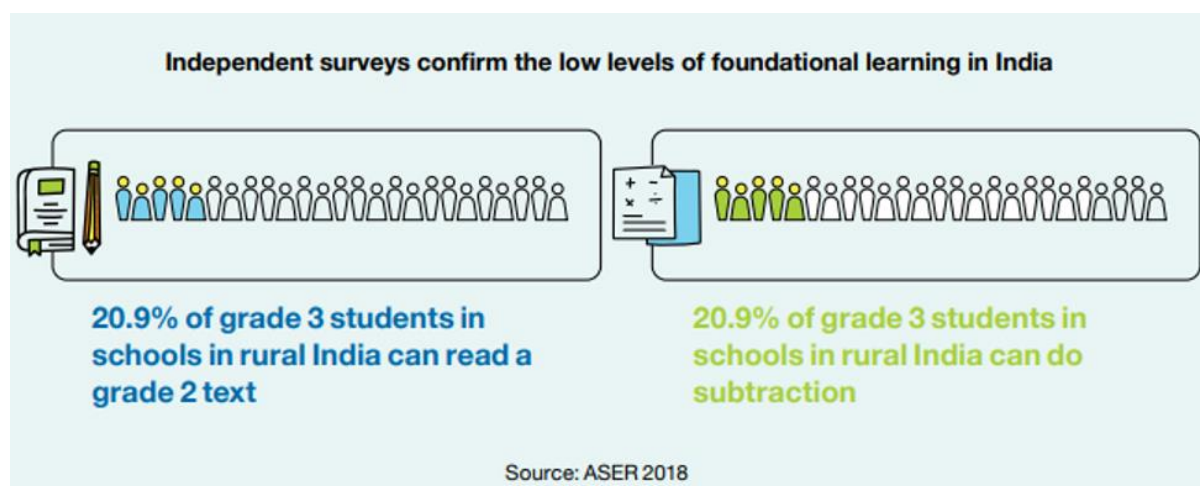
which was done in a number of states and UTs. In order to understand what Grade 3 children are capable of in terms of fundamental reading and numeracy skills as well as the scope of learning outcomes being attained, the study attempts to give accurate and valid data on them.[9] The National Report on Benchmarking for Oral Reading Fluency with Reading Comprehension and Numeracy, which was based on the study, was released on September 2, 2022, in each of the 20 languages.[6][7][8].

To meet the aim of the mission, the assessment needs to be conducted at a large scale and should be economically feasible. To meet the needs of the evolving system, a software assessment must be set up using the benchmarks as the passing criteria. For fair and smooth conduct, it has to be organised on a campus or at an exam centre on a digital platform under the supervision of invigilator(s). Questions from language and maths will be asked in form of puzzles and Multiple Choice Questions (MCQs). A dashboard is required where parents can see the performance of their ward, the school can see the class and the Ministry of Education can see the aggregated performances of schools, districts and states [10][11].

II. Literature review

With 25 crore students registered in 15 lakh schools, India boasts the biggest educational system in the world. Currently, our country has an almost universal enrollment of children at the primary level and half of all the school-going in primary grades. Students don't necessarily learn even after schooling— approximately 80% of grade 3 students in the rural part of the country cannot solve basic subtraction problems or read a grade 2 text (ASER 2018). Improving the levels of Foundational Literacy and Numeracy (FLN), i.e student's ability to solve basic mathematical problems and read with meaning by grade 3, is crucial as these skills are the base for learning in higher grades.

Fig 1: Graph by ASER for 2018, highlighting the poor learning levels among children



Foundational literacy

Prior language proficiency facilitates the development of literacy abilities. Important elements of foundational literacy include

A. Oral Language: Reading and writing abilities are developed through oral language experiences. Better oral vocabulary expanded conversational abilities, and greater listening comprehension is improvements.[1][12].

B. Decoding: A child should be able to draw relationships between symbols and their sounds while deciphering written words.

C. Reading Fluency: Relates to the capacity to read a text accurately, quickly (automaticity), expressively (prosody), and comprehend, which enables kids to derive meaning from the text. The majority of kids can recognise words and letters, but they read them slowly and laboriously one at a time.[2]

D. Reading Comprehension: This category includes the skills for reading, comprehending, and extracting information from texts. It necessitates analysing a text critically and deriving meaning from it.

E. Writing: Writing correct words and letters and using them with a grasp of their representation in sentences are competencies needed for this domain.[1]

Foundational Numeracy

The ability to use and comprehend fundamental arithmetic principles in day-to-day problem-solving is referred to as foundational numeracy. The main elements and features of early mathematical notions are

A. Pre-number concepts: Be familiar with the number system and how to count.[2]

B. Numbers and operations: Discover other standards required for mastering mathematical concepts, such as how to represent numbers using the base-ten system.[1]

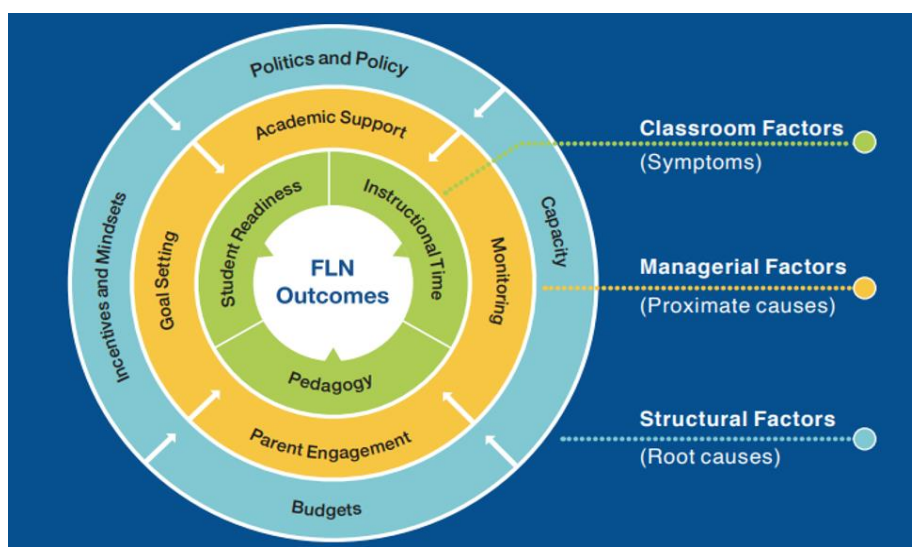
C. Shapes and Spatial Understanding: capable of applying simple calculations involving up to three-digit numbers to many contexts and daily activities.

D. Measurement: To execute addition, subtraction, multiplication, and division on integers with up to three digits, one must be able to comprehend and use established algorithms.

E. Data Handling: Discover and build upon basic patterns, from repeated forms to patterns in numbers, and apply them to his or her day-to-day activities.[4]

The graph below illustrates how a combination of interrelated factors acting at three levels— classroom, managerial, and structural—leads to poor FLN outcomes (as represented by each of the concentric circles in figure 2 below).[5]

Fig 2: Organizational elements that influence FLN results in teaching practices



In the long term, Parents and political leaders should be able to get a more clear picture of learning. Following the National Education Policy 2020, low-stakes key-stage exams in grade levels 3, 5, and 8 should be competency-based rather than test memorization. By implementing this in the primary grades, stakeholders will be more likely to prioritise FLN since learning will become more apparent.[7]

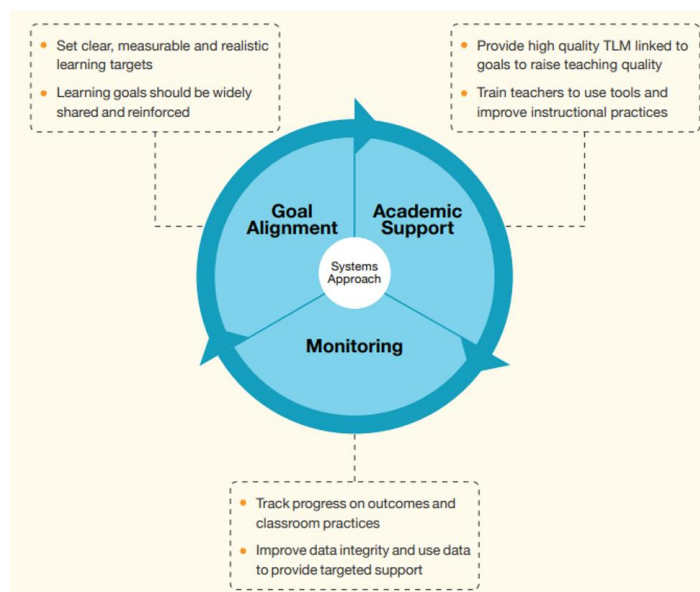
Supplementary fundamental problems that will lay the groundwork for a school system that can provide universal foundational literacy and numeracy include working to improve the quality of teaching through pre-service education reforms, aligning actor incentives with improvements in learning outcomes, as well as enhancing the effectiveness of capital spending on school education[13][14][15][16][17].

III. Proposed Methodology

Successful FLN programs have shown that in the short to medium term, FLN outcomes can be improved by focusing on three key areas that should be tightly tied together —

- A. **Goal Alignment:** Setting clear, measurable learning goals that can be tested against set benchmarks.
- B. **Academic Support:** Providing training and resources for teaching and learning which are effective.
- C. **Monitoring:** Using reliable information, examine academic goals and teaching quality.

Fig 3: Three key areas to prioritize and integrate to drive better learning outcomes



The proposed methodology is designed in a way such that it aligns with all the critical areas of the FLN. Following is the approach for its implementation:

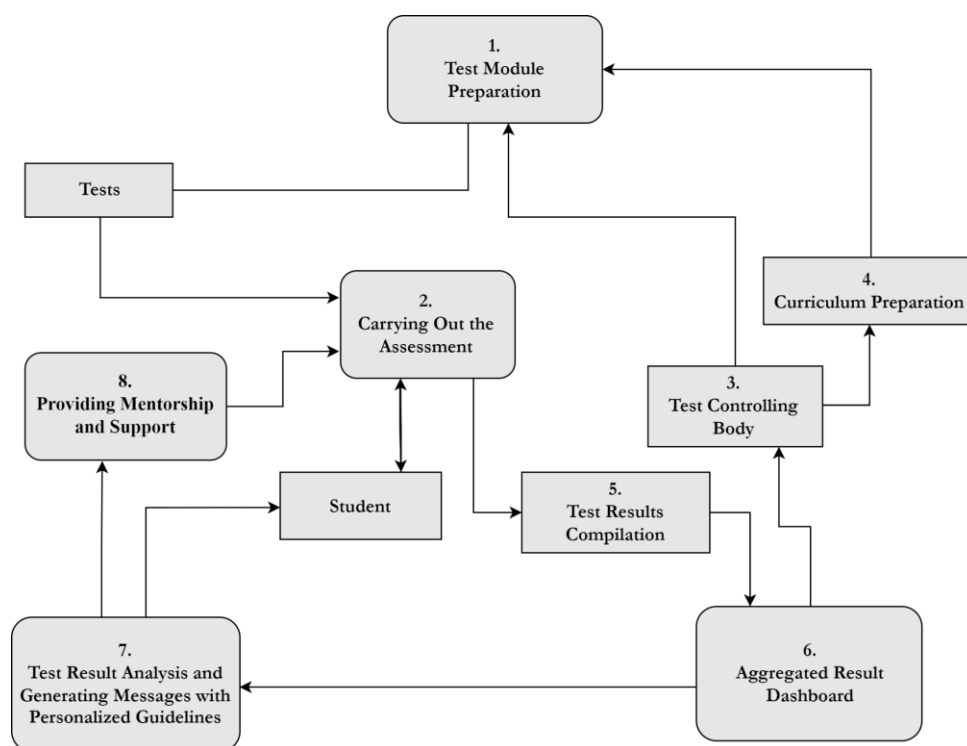
1. To prepare the minimalistic user interface for a test dashboard, where students can take up assessment activities such as reading comprehension, quizzes and puzzles etc.
2. The assessment will be scheduled on the school campus or at an assessment centre where the students will be assisted by teachers and other volunteers.
3. To provide a mock test for the students to familiarize them with the platform.
4. The assessment's problems will be based on the benchmark skill set that NCERT and the Ministry of Education established to measure students' literacy and numeracy levels.

5. Upon successful completion of the assessment, the student will be provided with a certificate of participation along with cumulative feedback for his/her performance.
6. The Ministry of Education's Department of School Education and Literacy must receive a performance card analysis.
7. Also, if the student clears the assessment he/she is to be provided with a certificate of merit.[1]

Judgement Criteria

The exam result will be evaluated in comparison to the standard set by the National Council of Educational Research and Training (NCERT).[1] The benchmarks are indicated for each of the four levels attained through policy linkage. Partial fulfilment equals 30, meets equals 50, and beyond equals 80 on a scale of 0 to 100. A mentor will be assigned to a candidate who received a partial score. [9]

Data Flow Diagram



Module Description

- 1. Test Module Preparation:** The aim is to provide the assessment in 20 Indian languages for reading fluency and comprehension in compliance with the reading proficiency benchmark for fluency and comprehension.
- 2. Carrying Out the assessment:** The test should be conducted at a facility which is designed specifically in accordance with the questionnaire. The students will be under the supervision of faculties in-charge and the entire process will be under the invigilation of a central officer appointed by the Ministry of Education or NCERT.
- 3. Test Controlling Body:** Under the Department of School Education and Literacy of the Ministry of Education (MoE), the national implementing organisation or the Test governing body will be headed by a Mission

Director. It will oversee both the teaching materials and pedagogies employed as well as serve as the test's invigilating body.[1]

4. Curriculum Preparation: The learning curricula should be created to instil the abilities essential for children's physical, cognitive, linguistic, emotional, and social development. Their various backgrounds, linguistic needs, and academic aptitudes should all be taken into account, and it should involve them actively in the learning process. The setting must be all-encompassing, integrated, welcoming, enjoyable, and stimulating for learning to take place.[3]

5. Test Result Compilation: The assessment data should be processed to produce an output which can be analytically used to grade the student. It will be further used to prepare the guidelines to prepare the learning curve.

6. Aggregated result Dashboard: To help the relevant authorities make the best decisions for their areas of jurisdiction at the country, state, district, block, and school levels, the aggregated findings of the evaluation must be created and shown on a dashboard. In order for both the school and parents to receive the entire report, one thorough analysis is necessary.[5]

7. Test Result Analysis and Generating Messages with Personalized Guidelines: Each student is provided with personalized feedback on their performance in the assessment. If the student clears the examination, a certificate of merit is issued and they are promoted to the new class, otherwise, the report card is shared and a mentor is provided for guidance and learning the student has to re-appear for the exam.

8. Providing Mentorship and Support: Children in Classes 4 and 5 who have not yet mastered the essential skills will get one-on-one teacher guidance and engagement, peer assistance, and graded learning tools that are age-appropriate and supplemental to aid in their development of the necessary skills. About 25 lakh teachers of pre-primary through primary schools will undergo FLN training this year since NCERT is developing a specific NISHTHA package for fundamental literacy and numeracy.[1]

Output Screens

Home Page



Foundational Literacy and Numeracy Assessment

About NIPUN Bharat

Educational programs should be designed to inculcate the skills necessary for the physical, cognitive, linguistic, emotional and social development of children. NEP 2020 expressed serious concern that there are about 5 crore students in our country who are unable to read, write or perform four basic mathematical operations. A Foundational Literacy and Numeracy (FLN) programme is initiated to improve the study material and quality of education.

A mission entitled NIPUN Bharat was launched at the national level for this purpose, with the aim of making all students in grade 3 and beyond in the country achieve foundational literacy and numeracy by 2025. The NIPUN Bharat mission outlines learning outcomes which have been designed in a spiral and progressive manner.

- Dashboard
- Mock Test
- Resources
- Guidelines

Foundational Learning Cycle



Imparting Feedback

Lorem ipsum dolor sit, amet consectetur adipisicing elit. Rem cupiditate ducimus maiores, iste voluptas vero quos doloribus iusto, consectetur, aspernatur quam officiis labore? Vel eius praesentium deserunt dignissimos, ipsum quam? Lorem ipsum dolor sit amet consectetur adipisicing elit. Quaerat fugiat beatae veritatis dignissimos eius nemo laudantium, aut explicabo, cumque error sunt pariatur quisquam praesentium iusto vitae hic, doloremque magni sapiente.

Test Module



FOUNDATIONAL LITERACY AND NUMERACY ASSESSMENT

What is another word for amazed?

Surprised

Mesmerised

shocked

confused

What is the plural form a knife

Nives

Nifes

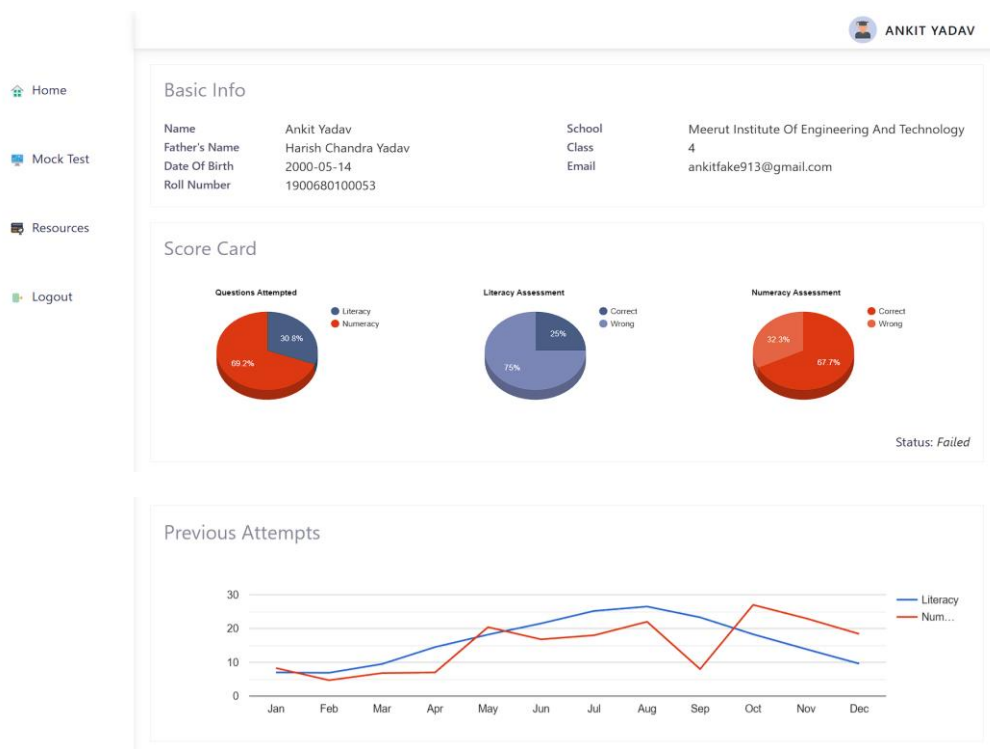
Knives

Knives

QUIT

SUBMIT

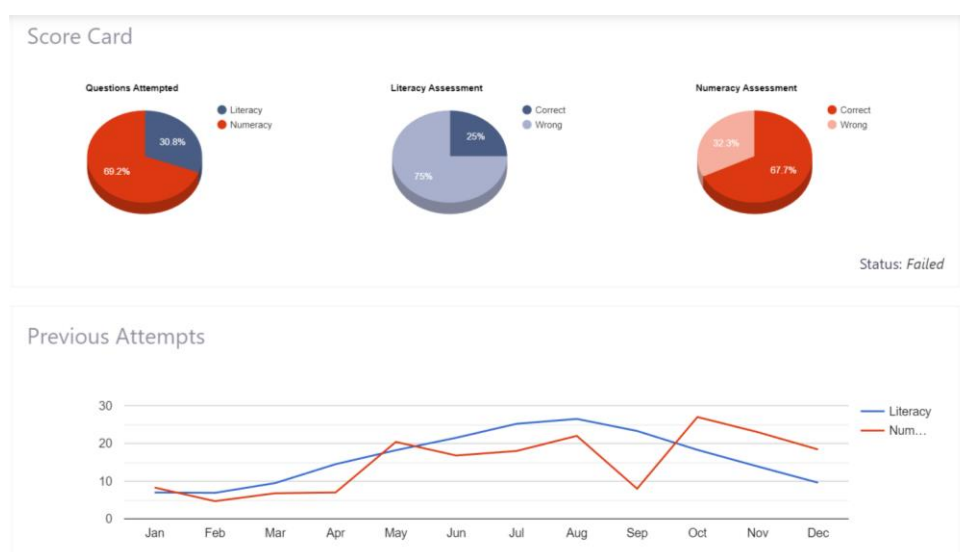
Result Dashboard



IV. Experimental Result discussion

Exam: The exam is conducted on the software platform which will be proctored for fair conduct. For the ease of the users, a replica of the test platform will be available for the student to get familiar with the interface and functionality.

Result: The student is awarded a grade as per the performance on the test, also an email of the report card is sent to the registered email address. If the grades partially meet or do not meet the benchmark criteria, a mentor appointed by NCERT is assigned to the student.



V. Conclusion

Literacy Assessment

Global Proficiency Levels	Below Meets Minimum Proficiency	Partially Global Proficiency	Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
Definition	Most fundamental information and abilities are lacking in learners. As a result, they frequently are unable to complete even the most basic grade-level assignments.	The knowledge and abilities of learners are restricted. Thus, they are limited to completing a few basic grade-level assignments.	Learners have acquired the necessary information and abilities. They may competently finish even the easiest grade-level assignments.	Learners now possess higher information and abilities. They can thus complete difficult grade-level assignments.	
Measure performance	In one minute, properly read words from 0 to 14 with understanding.	In one minute, properly read 15 to 34 words with understanding.	In one minute, properly read 35 to 53 words with understanding.	In one minute, properly read 53 or above words with understanding.	
% of participants who attain the standard	15	30	21	34	

[9]

Numeracy Assessment

Global Proficiency Levels	Below Meets Minimum Proficiency	Partially Global Proficiency	Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency..
Definition	Most fundamental information and abilities are lacking in learners. As a result, they frequently are unable to complete even the most basic grade-level assignments.	The knowledge and abilities of learners are restricted. Thus, they are limited to completing a few basic grade-level assignments.	Learners have acquired the necessary information and abilities. They may competently finish even the easiest grade-level assignments.	Learners now possess higher information and abilities. They can thus complete difficult grade-level assignments.	
Measure performance	Score Points 0-42	Score Points 43-69	Score Points 70-83	84 and above	

% of participants who attain the standard	11	37	42	10
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