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Reach Teach Learn

A REPORT ON IMPLEMENTATION OF REACH TEACH LEARN: A LEARNING ENHANCEMENT PROGRAMME AT SECONDARY LEVEL IN MEGHALAYA

FOR
SAMAGRA SHIKSHA
STATE EDUCATION MISSION
AUTHORITY OF MEGHALAYA (SEMAM),
GOVERNMENT OF MEGHALAYA

BY BHOOMI EDUCATIONAL
CONSULTANCY, NEW DELHI

Bhoomi Educational Consultancy
"Empowering Sustainable Education"

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With Kind Regards
For Bhoomi Educational Consultancy Private Limited,

Beas Bhowmik

Director,
For Bhoomi Educational Consultancy Pvt. Ltd.

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introduction

Reach Teach Learn(RTL) is a Whole School Turnaround (WST)/School Excellence Programme model based on the premise that sustained instructional change is essential to ensure that learning outcomes improve. This sustained instructional change can be brought about by the Key stakeholders in the education programme i.e. Teachers, Head Teachers and Parents. There are three critical components of the programme that ensures that learning gap is bridged and progress achieved is sustained till the next academic year.

Student Readiness Programme

This is Step 1 of the Learning Recovery Programme. The Student Readiness Programme is a fast-paced learning course implemented over 1.5 months. The aim of this part of the programme is to ensure that student learning gap is identified and it is bridged through a learning programme which is targeted at earlier competencies student should have attained before they have come to a particular class. This is usually recommended to be implemented at the beginning of the academic year so that some key competencies of the earlier classes may be revised.

Active Learning

Step 2 of the Readiness Programme includes an Active Learning component during classroom transactions after students have completed the Readiness Sprint. It is evident that after an intensive readiness programme, there would be significant difference in student learning level. This change in the learning level would hold, if methods and teaching strategies in the classroom were project based and included 21st Century skills.

Active learning methods ensure that students to engage in their learning by thinking, discussing, investigating, and creating. In class, students practice skills, solve problems, struggle with complex questions, make decisions, propose solutions, and explain ideas in their own words through writing and discussion.

a. Connecting the concept with real life and community through 21st century skills projects.
b. Learning pathway is clearly charted in lesson plans.

The Neeve Web Portal has learning resources that can be used to create sessions where students cooperate and learn from one another. The Neeve Web Portal includes more than 1,000 Lesson Plans, Worksheets and Videos. The activities are grouped into the areas of Literacy, Mathematics, Science, and 21st Century Skills. The Web Portal presents simple resources that guarantees hands-on learning experiences.

Supplementary Learning

Phase 3 of the programme implemented along with Phase 2 is the Supplementary Learning Phase which provides students with an opportunity to receive extra help in academic subjects after school hours or at home so that student can practice the lessons that they have learnt in school. This is particularly helpful for children who have developed learning gaps or are in need to extra support. Supplementary learning

creates greater equity in the education system, addressing the rights of these students to get a better chance at education

Supplementary learning is most effective when it is very different from the main mode of education, i.e., classroom teaching. Some examples are, educational TV programmes, educational games or learning apps – the last mode is highly preferred by students now.

Neeve is a lightweight mobile learning app made for students for supplementary learning. Neeve covers class 6-10 and has 3 subjects, English, Science and Maths.

a. Neeve is adaptive in nature. This means, the App adjusts itself to suit the learning level of the students. An advanced student and a struggling student will get separate set of practices to support their individual needs.
b. Students need android smartphone and a working internet connection (wifi or mobile data) to use Neeve. Neeve can be downloaded from Play Store and students can register following few simple steps. Each student's account is then preserved for as long as they are in secondary school.

Neeve has practice worksheets and activities in every chapter that consolidates the learning the that the teacher imparts in class.

Implementation : Reach Teach Learn

Preparatory Meeting: The preparation for RTL began with a series of meetings with the State officials. The proposal and subsequent documents were submitted and the schools were selected based on discussion with the department. All schools were connected to the Neeve Web Portal and students already enrolled on the Neeve App were transitioned to the next class. The base for the programme was complete and the programme was ready to be implemented.

Student Readiness

The Student Readiness has 3 parts:

a. The Diagnostic Test Phase: A rigorous baseline assessment is administered to all students in from Classes 6-9 where remediation is carried out. Learning gaps are identified and the learning trajectory of each student is recorded for his or her academic year. In the Baseline Assessments, students are identified at different levels of competency based on the test: Aspiring (students with marks between 0-40%), Scholar (students with marks between 41-80%) and Master (students with marks between 81-100%).
b. The Intervention Phase: The intervention phase includes the actual transaction of the curriculum in the classroom and includes the transaction of clearly designed instructional materials. Teachers use active learning methods in the classroom which means that sessions are designed in a way so that he or she will typically spend more time helping students develop their understanding and skills (promoting deep learning) and a lesser proportion of time transmitting information (i.e., supporting surface learning).
c. Evaluation Phase: In this phase, students' learning levels are assessed after the completion of Student Readiness. This will be done in an Endline Assessment where students will be administered an assessment after undergoing 1.5 months of lessons. Over and above this, a continuous analysis of results over the academic year will be maintained to create a student portfolio.

Diagnostic and Endline Assessment Under RTL

Assessment plays an important role in the process of learning. The kind of tasks that the learners perform determines how they will approach the learning task and what study behaviours they will use. Also, Assessment pushes instruction by stressing the importance of critical thinking, reasoning, and reflection thus creating a quality learning environment.

Diagnostic Assessments are primarily conducted to identify students' prior knowledge, strengths, and areas that need improvement. It helps educators design lessons that meet students' needs effectively. For example in a Maths class, before beginning a unit on fractions, a pre-test is administered to evaluate students' existing understanding of the concept. Based on the results, the teacher adjusts the lesson plan to focus on the areas where students struggled, ensuring that they have the foundational knowledge necessary for mastering fractions.

The Endline Assessments are created to assess the students after the Readiness Curriculum is transacted to observe the progress in their learning. Since the Diagnostic and Endline Assessments have not been made to grade a child but to help the student and the teacher understand the learning level of the child, consequently, the papers have been built primarily around two premises.

Premise 1

First, a student of say, Class 6 should have certain competencies- for that we referred to the Learning Outcomes set by the NCERT. In an English language class, a student of class 6 should be able to frame grammatically correct statements. He /she should be able to read and write simple passages- understand the main idea, write letters to parents, make a diary entry using simple language. That is why the grammar portion focusses on parts of speech questions for a child to frame correct sentences would need to know his/her nouns, pronouns, prepositions and so on. Similarly, the reading and writing segments present simple tasks such as identifying the main idea or answering questions from the text and writing letters to the grandfather thanking him for the birthday gift.

In Class 6 Maths, the section begins with simple multiple-choice questions about basic concepts including number system, fractions, divisibility rules, factors, measurements, and basic foundational concepts. Short questions are problems that involve simple calculations (possible in mind or quickly on paper) or reasoning, focusing more on competency rather than complex calculation or memorisation.

Similarly, in Class 6 Science, the section begins with a simple multiple-choice question relating to science vocabulary and keywords that can be quickly answered. The short descriptive questions are about basic concepts like change of states of matter, simple machines, air and combustion - spread across the breadth of the curriculum. The focus of the MCQ and short questions is to build confidence of the students in small bits.

Premise 2

The second premise was that the syllabus of the previous two to three classes should also be mapped to the assessment so that the children are evaluated and the school can ensure that they are ready for their present class.

It was decided to use questions to assess various levels of learning outcomes, from basic recall to application, analysis, and evaluation. The reliability is enhanced when the number of MC items focused on a single learning objective is increased. In addition, the objective scoring associated with multiple choice test items frees them from problems with scorer inconsistency that can plague the scoring of essay

questions. Because students can typically answer a multiple-choice item much more quickly than an essay question, these tests can typically focus on a relatively broad representation of course material, thus increasing the validity of the assessment.

Assessment for English

The English Assessment is structured and closed as it includes the competencies under sections of Grammar, Reading and Writing.

Section A – Reading.

This section covers all the competency skills prescribed by the NCERT for the previous three classes.

The section begins with a simple multiple-choice question relating to vocabulary that can be quickly answered. , there are comprehension passages – all employing strategies like citing textual evidence, drawing inferences, citing main idea, sequencing and so on. The passages use simple language and interesting content and the exercises are simpler- so that the students are not intimidated by the thought of comprehending unseen passages

Section B – Grammar

This section goes from the simple to the complex. It covers all important topics covered in the syllabus of the previous three classes. The section begins by asking questions about parts of speech – Nouns, pronouns, adjectives, adverbs, and prepositions, which are considered to be the backbone of

the English language. It is important to understand the different parts of speech to know how words can and should be used together to make sentences. Also, understanding the parts of speech helps students to use punctuation correctly in sentences. Besides lessons like Time & Tense, Voice and sentence structure has also been included.

Section C - Writing

This section tests the students on their productive skills. The pattern again is from simple to complex. The questions in this segment require short structured answers which are typically composed of a brief prompt that demands a written answer of a few sentences. They are most often used to test basic knowledge of key facts and terms. These questions can also be used to test higher thinking skills, including analysis or evaluation. For example: Please justify your decision with two to three sentences explaining the factors that have influenced your decision.

Assessment for Science

In Classes 6-7, the science curriculum is mostly life sciences, hence almost 60% of questions are on biology or ecology. As the class goes higher, life science and physical science constitute almost equal portions of the question paper. Lower classes have simpler topic, ‘understand’ skill dominates the MCQ whereas the ‘apply’ skill is tested in short answer questions. Questions in the lower classes can be leading in some cases. Higher classes have keywords, definitions, and short explanations for everyday matters. In higher classes students are encouraged to explain their thoughts in simple language.

Physical science, particularly physics questions dominate the question paper in higher classes. Concepts of light, sound, change of state, environment (physical part of it) have been included. Biology is higher class deals with structure and functions of plants and animals – cells, tissues, and organs. Questions

based on diagrams are a great way to engage students, diffuse exam stress and build confidence. At least one diagram labelling is also included in biology questions.

Assessment for Maths

In class 6, almost two third of the mark are allocated for arithmetic, whereas in class 9 arithmetic questions constitute only 35%. Arithmetic forms the basis of mathematics in the foundation level, hence the emphasis. Number, number lines, basic operations, simple fractions, factors-multiples all are included more in lower classes. Complex multi-step operations, fractions and decimals related questions are asked in higher classes. Questions do not test the proficiency for complex calculation, rather checks application of basic rules of arithmetic, handling of small problems.

Geometry questions make up for 25 – 40% marks across classes. Concepts range from basic shapes to properties of triangles and lines, relationship between simple shapes. Area and perimeter are also covered.

Data handling, statistics are important concepts. 10-20% marks are allocated for this. Question ranges from basic tally marking in lower classes to creating or interpreting charts and graphs in higher classes. The focus, again, is on application of concepts rather than calculation skill.

Baseline Assessment

Overview:

The necessary directions from the state were issued to conduct the diagnostic assessment of the students. Some salient features of the essence of direction of Assessment was as followed:

In the first phase, The diagnostic test was conducted in 15 schools, details were given below.The question paper for diagnostic assessment was based on the learning outcome developed by the NCERT. The Diagnostic assessment was conducted for more than 1000 students of Grade 9 and grade 10.

Each assessment was time bound (one hour thirty minutes) and to be individually completed by a student.In the assessment Students was identified at 3 levels: a) Aspiring: students scored between 0-40% and b) Scholar: students scored between 41-80% c) Master: students scored between 81-100%.

The Assessment papers were checked based on the Score Cards shared with the teachers. The Results were shared by schools with blocks and districts.Bhoomi Team and the Samagra Shiksha, SEMAM, Govt of Meghalaya has initiated the 4 Days Offline Training Programme for the BRP's and CRCs of different blocks and clusters for implementation of Diagnostic Assessment.

Administration of Assessment

In view of assessing the learning achievement of school students, a need was felt to conduct a baseline Assessment of students in the state. The office of Samagra Shiksha, SEMAM, Govt of Meghalaya approved a Baseline Assessment in all secondary schools to be administered by Bhoomi Educational Consultancy.

The main objective of the Baseline assessment was to include the identification of student's learning levels through a diagnostic test. The other objectives of conducting the Assessment Diagnostic Test are to: Enhance teacher's knowledge on students learning level and evaluating students' knowledge on basic levels.

The necessary directions from the state were also issued to conduct the diagnostic assessment of the students. The School Head administering the assessments in the school underwent orientation on the purpose of the assessments and expected behavioural norms from teachers and students during the assessments.

Distribution of the Assessment Papers

Some salient features of Administration of Assessment was as followed:

At the District level District team constituted under the leadership of District Mission Coordinator (DMC) who will be the District Nodal Officer (DNO) for Meghalaya Baseline Assessment (MBA) 2023.

All 102 government have been selected for Assessment, 2023-2024.

The orientation of Head of schools and BRPs and District heads was done by the Bhoomi team on 16/03/2023-D.C CONFERENCE HALL, Jowai, West Jaintia Hills-35 participants, On 17/03/2023-DSEL CONFERENCE HALL, Shillong, East Khasi Hills-24 participants, On 17/03/2023- Don Bosco Hall, Pyndengrei, West Khasi Hills -25 participants, On 20/03/2023-S.M.E.LC Hall, Tura, West Garo Hills-48 participants, On 21/03/2023- Multi Facility Centre Hall, Baghmara, South Garo Hills-16 participants, On 21/03/2023-DSEO CONFERENCE ROOM, Williamnagar, East Garo -12 participants.

Assessment Tools were distributed to the officials during the training. All BRPs had handed over Assessments tools one day earlier of the day of MBA 2023. MBA was conducted on 27th March to 31st March 2023.

Supervision on the day of MBA 2023 was done by the Subject teachers, Head teachers, BRPs, CRCs and otherofficial nominated by the District office and his/her team and the State office and his/her team.

Enumeration/ evaluation were done by the subject teachers at the concerned level under the supervision of head of the schools.After enumeration, the score card was sent to the Bhoomi team.

Key Findings and Observations

After completing the diagnostic Assessment following key results have been observed.

Key Finding 1: Students appeared for Assessment vis- a -vis Enrolment (%)

Results of students appeared in three subjects- English, Maths and Science at the district level show:

Table : Students appeared for Assessment vis- a -vis Enrolment

SN	District	School	UDISE	Class	Enrolment	English	%	Maths	%	Science	%
1	EAST KHASI HILLS	Ichamati SSA UP & RMSA Seconadry School	17060604703	9	40	37	92.5	37	92.5	40	100.0
2	WEST KHASI HILLS	Mallangkona Govt Higher Sec. School	17040134701	9	36	31	86.1	36	100.0	36	100.0
3	EAST KHASI HILLS	Mawrynkneng Rmsa Sec School	17060305105	9	36	36	100.0	36	100.0	36	100.0
4	WEST KHASI HILLS	Run Thabah Memorial Secondary School Pariong	17040403910	9	35	35	100.0	35	100.0	35	100.0
5	WEST JAINTIA HILLS	Mustem SSA UP & RMSA Secondary School	17070100401	9	27	27	100.0	27	100.0	27	100.0
6	RI BHOI	Mynken RMSA Sec School	17050203001	9	70	70	100.0	70	100.0	70	100.0
7	WEST JAINTIA HILLS	Govt. U.P.S Mowkaiaw & RMSA Sec. School	17070200101	9	64	64	100.0	64	100.0	64	100.0
8	WEST JAINTIA HILLS	Govt. U.P.S Shangpung & RMSA Sec. School	17070213103	9	64	64	100.0	64	100.0	64	100.0
9	SOUTH WEST GARO HILLS	Boldamgre RMSA Sec School	17110218001	9	48	38	79.2	43	89.6	48	100.0
10	EAST KHASI HILLS	SHILLONG PUBLIC SCHOOL	17060900204	9	51	51	100.0	50	98.0	50	98.0
11	WEST KHASI HILLS	Sibsingh Memorial Govt. H/S School	17040242321	9	102	102	100.0	102	100.0	101	99.0
12	EAST KHASI HILLS	Lamjingshai Rmsa Sec School	17060806203	9	42	14	33.3	14	33.3	14	33.3
13	RI BHOI	MAWRONG RMSA SECONDARY SCHOOL	17050224501	9	55	51	92.7	50	90.9	50	90.9
14	RI BHOI	Saiden RMSA Sec School	17050102101	9	50	50	100.0	48	96.0	47	94.0
15	EAST KHASI HILLS	PINE MOUNT SCHOOL	17060900507	9	194	194	100.0	116	59.8	190	97.9
					914	864	94.5	792	86.7	872	95.4

Observation

Attendance in Science examination is the highest followed by Maths and then English.

Key Finding 2 : State wise student Learning Level (%)

At a glance, results of students in three subjects- English, Maths and Science at the State level show:

Subjects	Aspiring	Scholar	Master
English	53.5%	40.8%	5.7%
Maths	66.9%	31.6%	1.5%
Science	79.58%	20.18%	0.24%

Observations

Total No. of students who are at the Aspiring level (0-40%) is the highest in Science, followed by Maths and then English.

The number of students at the Scholar level (41-80%) is the highest for English, followed by Maths and Science.

Students at the Master's level (between 81-100%) is negligible in all three subjects

Key Finding 3 : School wise student Learning Level (%)

At a glance, results of students in three subjects- at the school level show below:

SN	District	School	English 0-40 %	English 41-80 %	English 81-100 %	Maths 0-40 %	Maths 41-80 %	Maths 81-100 %	Science 0-40 %	Science 41-80 %	Science 81-100 %
1	EAST KHASI HILLS	Ichamati SSA UP & RMSA Seconadry School	91.9	8.1	0.0	73.0	27.0	0.0	100.0	0.0	0.0
2	EAST KHASI HILLS	Mawrynkneng Rmsa Sec School	86.1	13.9	0.0	63.9	36.1	0.0	55.6	44.4	0.0
3	EAST KHASI HILLS	SHILLONG PUBLIC SCHOOL	0.0	84.3	15.7	28.0	70.0	2.0	46.0	54.0	0.0
4	EAST KHASI HILLS	Lamjingshai Rmsa Sec School	71.4	28.6	0.0	71.4	28.6	0.0	71.4	28.6	0.0
5	EAST KHASI HILLS	PINE MOUNT SCHOOL	4.6	78.9	16.5	53.4	37.9	8.6	75.8	23.2	1.1
6	RI BHOI	Mynken RMSA Sec School	97.1	2.9	0.0	98.6	1.4	0.0	95.7	4.3	0.0
7	RI BHOI	MAWRONG RMSA SECONDARY SCHOOL	0.0	84.3	15.7	28.0	70.0	2.0	46.0	54.0	0.0
8	RI BHOI	Saiden RMSA Sec School	16.0	84.0	0.0	54.2	45.8	0.0	85.1	14.9	0.0
9	SOUTH WEST GARO HILLS	Boldamgre RMSA Sec School	73.7	26.3	0.0	72.1	27.9	0.0	79.2	20.8	0.0
10	WEST JAINTIA HILLS	Mustem SSA UP & RMSA Secondary School	100.0	0.0	0.0	100.0	0.0	0.0	55.6	44.4	0.0
11	WEST JAINTIA HILLS	Govt. U.P.S Mowkaiaw &	75.0	25.0	0.0	73.4	26.6	0.0	82.8	17.2	0.0

SN	District	School	English 0-40 %	English 41-80 %	English 81-100 %	Maths 0-40 %	Maths 41-80 %	Maths 81-100 %	Science 0-40 %	Science 41-80 %	Science 81-100 %
		RMSA Sec. School									
12	WEST JAINTIA HILLS	Govt. U.P.S Shangpung & RMSA Sec. School	81.3	17.2	1.6	98.4	1.6	0.0	96.9	3.1	0.0
13	WEST KHASI HILLS	Mallangkona Govt Higher Sec. School	80.6	19.4	0.0	55.6	44.4	0.0	66.7	33.3	0.0
14	WEST KHASI HILLS	Run Thabah Memorial Secondary School Pariong	85.7	14.3	0.0	60.0	40.0	0.0	100.0	0.0	0.0
15	WEST KHASI HILLS	Sibsingh Memorial Govt. H/S School	90.2	9.8	0.0	74.5	25.5	0.0	99.0	1.0	0.0
Learning level			Aspiring English	Scholar English	Master English	Aspiring Maths	Scholar Maths	Master Maths	Aspiring Science	Scholar Science	Master Science
Total State			53.5	40.9	5.7	66.9	31.6	1.5	79.6	20.2	0.2

Observations:

A class-wise analysis reveals that in Class 9 in all districts in all three subjects,

1. English: In all districts, the % of students in Aspiring level is between 4.6 - 100%.

2. Maths: In all districts, between 28%-100% students are at Aspiring level.

3. Science: In all districts, between 46%-100% students are at Aspiring level.

Key Finding 4 : Schools with Aspiring Students

Schools with Aspiring Students: At a glance, results of Schools with Aspiring Students in three subjects English, Maths and Science show below:

Table : Schools with Aspiring Students

Subject	Total Schools with 75% and above Aspiring students	Total Schools with less than 50%Aspiring students	Total Schools with 50- 74% and above Aspiring students
English	73.3	13.3	13.3
Maths	20.0	13.3	66.7
Science	60.0	13.3	26.7

Observation

Amongst the schools where the Assessment was administered, there are 2 schools that have above 75% students who are at the Aspiring level in all three subjects.

Capacity Building of Key Stakeholders

At the Secondary level, teachers face the unique situation of having students who are not at the age and grade appropriate learning levels. Therefore, they should be equipped to remediate for their students as

well as prepare them for the Board examination. Teachers need to be trained and supported to ensure that they have the appropriate skills to manage differential learning levels among students. While Teachers are expected to teach and remediate, it's important to select a group of resource persons who will observe and share their feedback with the teachers and support in course correction of the lessons transacted if required.
While it is expected that the Cluster Resource Group(CRC) and Block Resource Group(BRC) members have the subject knowledge required for the position of a Resource Person that they have been selected for, they would require to be trained on observation strategies and methods of sharing feedback so that Classroom Observation may be effective and successful.

The training was designed in alignment with three key principles:

Experiential-- "learning by doing" . The training was designed to include performance tasks which are followed up with feedback and personal reflection. Methods such as roleplays and demonstration of sessions were used in the sessions.

Active – Training was not restricted to just "receiving" lectures or handouts. Participants engaged in discussions, games, activities to build concepts and skills.

Actionable -- Actionable trainings focus on knowledge, skills, and attitudes that have a practical utility and will help participants make an impact. Each session has direct link to the classroom realities of teachers and what CRC and BRC would encounter in the classrooms.

Training of Cluster Resource and Block Resource Group members

The one-day training titled "Training of, CRCs and BRCs for Meghalaya Reach Teach Learn Programme." Aims to thoroughly familiarise the officials with the programme. The purpose of this training was to train participants on the concept of Meghalaya Reach Teach Learn Programme. Training included various topics such as Reach Teach Learn Programme Model, Monitoring and Supporting the Programme and individual contribution to the programme. The training methodology was interactive as the trainers ensured that knowledge was not only disseminated but accurately perceived and understood by the participants. And in order to ensure this, trainers engaged participants in discussions and kept the forum open for feedback, queries and suggestions. These discussions and interactive sessions were supported through training material such as post-It, Colouring material, chart papers, power point presentations and handouts etc.

The Cluster Resource Group(CRC) and Block Resource Group(BRC) members were trained between 16-21 March, 2023 in West Jaintia Hills, East Khasi Hills, West Khasi Hills , West Garo Hills, South Garo Hills and East Garo Hills to impart the knowledge on the programme and how to observe and give feedback to teachers.

Teaching Learning under the Learning Enhancement Programme

The aim of the Learning Enhancement Programme implemented in Classes 6-9 is to ensure that learning gaps that students have accumulated over the years is addressed and students are able to effectively learn the curriculum of the earlier classes. On the other hand, while knowledge and skill gaps are being

bridged, the curriculum of Class 6-9 needs to continue and students need to acquire previous competencies along with the syllabus of the current class. The resources are created in a way to bridge the learning gap and to create the foundation for age appropriate education while also supporting teachers with graded resources for the current class that can address the diverse learning levels of students.

Pedagogical Approach

LEP curriculum while bridging learning gaps need to be student focussed and text-based simultaneously. Questioning, thinking and responding should be driven by student's responses and interests as well as content and demand of the school text and syllabus.

Therefore, while knowledge and skill gaps are being bridged, the class curriculum needs to continue, and students need to acquire previous competencies along with the class curriculum.

That is why active learning strategies is the methodology of choice that has been used in LEP as it will allow students to learn the curriculum through reading, writing, discussion, or problem-solving, which promote analysis, synthesis, and evaluation of class content. This will ensure that diverse students engage with each other to understand the lesson transacted in the classroom and can reflect on it. Thus, active learning strategies include interconnectedness between students allowing all students to participate in classroom processes and provide inclusiveness for marginalised students who do not have the requisite learning levels.

Active learning instructional strategies in LEP resources engage students to think critically, work collaboratively in small or large groups, giving and receiving feedback and reaching conclusions based on the learning experience. When an instructor employs active learning strategies, s/he will typically spend a significant time focussing on supporting students to develop their understanding rather than just transfer of knowledge. Other than improving students' knowledge of a particular topic, the teacher provides the opportunity for students to apply their knowledge to real-life situations. The students are also encouraged to provide feedback to other students based on what has been demonstrated in class.

While Active Learning Strategies used for LEP include learning by doing, it also promotes inclusiveness through addressing the need of all students at different learning levels, recall earlier competency for students who are not at the requisite learning, and finally connect previous skills to current lesson through appropriate bridging.

The following are some of the key features of the Readiness Curriculum:

- The Readiness Curriculum is based on NCERT Learning Outcome Framework rather than a particular syllabus. There are certain key competencies that students should know in a particular class. The course targets those competencies and not specific textbooks or boards. This is an essentially Competency Based Curriculum
- Worksheets for Readiness are marked as Easy, Medium and Hard. Teachers are expected to use the worksheets as per discretion. If we have a student who is at scholar level, we can use 1 easy worksheet, 2 Medium. We could also try the Hard with them. However, if the student is Aspiring, they can do all Easy and one Medium level worksheet.

Teaching-Learning Process

Remedial Teaching curriculum while bridging learning gaps need to be student focussed and text-based simultaneously. Questioning, thinking and responding should be driven by student's responses and interests as well as content and demand of the school text and syllabus. Remedial Education has been delivered independently of the existing school syllabus, creates difficulty in connecting remedial education to the current curriculum as it is transacted in the classroom.

Therefore, while knowledge and skill gaps are being bridged, the class curriculum needs to continue, and students need to acquire previous competencies along with the class curriculum.

That is why active learning strategies should be the methodology of choice as it will allow students to learn the curriculum through reading, writing, discussion, or problem-solving, which promote analysis, synthesis, and evaluation of class content. Therefore, ensures that diverse students engage with each other to understand the lesson transacted in the classroom and can reflect on it. Thus, active learning strategies include interconnectedness between students allowing all students to participate in classroom processes and provide inclusiveness for marginalised students who do not have the requisite learning levels.

Active learning instructional strategies can be used to engage students to think critically, work collaboratively in small or large groups, giving and receiving feedback and reaching conclusions based on the learning experience. When an instructor employs active learning strategies, s/he will typically spend a significant time focussing on supporting students to develop their understanding rather than just transfer of knowledge. Other than improving students' knowledge of a particular topic, the teacher provides the opportunity for students to apply their knowledge to real-life situations. The students are also encouraged to provide feedback to other students based on what has been demonstrated in class.

While Active Learning Strategies used for Remedial Education will include learning by doing, it will also promote inclusiveness through addressing the need of all students at different learning levels, recall earlier competency for students who are not at the requisite learning, and finally connect previous skills to current lesson through appropriate bridging.

The following processes will be included in the curriculum while designing the curriculum for LEP:

1. Consolidation of Prior knowledge through competency-based curriculum: Consolidation of Prior knowledge refers to skills and competencies that students need to acquire before s/he is promoted to the next class. Prior knowledge has been considered to influence future learning and student achievement. If there is a mismatch between students' actual knowledge and the teachers' expectation of that knowledge, learning will be hampered. The curriculum for LEP will identify key competencies that are essential for students to acquire before they can comprehend the curriculum of their current class.
2. Connecting Student Readiness lessons to current syllabus/lesson: All students receive high-quality instruction in the classroom where classroom instruction will recall prior competencies connected to lessons in Class 6-9. Each chapter in Class 6-9 will be connected to two-three key competencies through a backward mapping. These competencies will be taught to students before a particular Chapter in Class 6-9 is taught. Therefore, each lesson (or a group of lessons) will be grouped as

themes connected to which prior lessons will need to be transacted for students to understand that particular lesson.

3. Subject based Curriculum

- English Instruction is rooted in the following instructional standards:
  - All standards (listening, speaking, reading and writing) should be taught in an integrated manner and students should be given the chance to connect the standards in different ways. For example, students may listen to a narrative story and talk about character development, listen to a poem and discuss how sound repetitions contribute to the poem's rhythm.
  - Regular practice with simple and complex texts
  - Focus on four key skills: Listening, speaking, reading, writing with the purpose of comprehending simple and complex text, both literary and informational
  - Building knowledge through content rich fiction and nonfiction
- Science Instruction at this level will include the following instructional standards:
  - Support students in observation, analysis, critical thinking and raising critical questions
  - Ensure that students learn classification, design, planning and organisation
  - Ensure that students are able to read and decode information in multiple formats including tables, charts and diagrammes
  - Employ technical writing skills to be able to write scientific procedures
  - Use appropriate academic vocabulary when communication scientific phenomena.
  - Provisioning of ample opportunity for students to engage in the practices and applications of Science.

-Maths instruction at this level will include the following instructional standards

- Support to students to build mathematical fluency: procedural and conceptual
- Build conceptual understanding of students using mathematical concepts
- Solidify and understanding of multiple problem-solving strategies
- Ensure that students are able to engage in mathematical thinking and reasoning
- Students are provided with opportunities for regular practice and support in demonstrating fluency in algebra
- Students are provided with opportunities to apply problem solving skills in new and unfamiliar contexts and situations.

4. Differential instruction on Mathematics, Science and English: A multi-tier approach is used to differentiate instruction for all students. The curriculum has two basic attributes: a) concepts that should have been previously learnt are introduced so that students can recall and retain key concepts of earlier classes b) New concepts are introduced build on what has been already learnt by the student. E.g. To teach Fundamental Unit of Living Things in Class 9, two key concepts need to be introduced to students: a) discussion of keywords connected to the word cell b) Awareness of different types of cells c) Difference between living and non-living things. Finally, the actual chapter of Class 9, i.e. The Fundamental Unit of Living Things should be introduced in the classroom.

5. Relevant Curriculum: When students are bored they are unable to learn which is particularly true for students with a learning gap. Since they lack the earlier competencies to grasp the current curriculum, boredom would become an obstacle to learning the current curriculum. The LEP curriculum makes the current curriculum relevant as it considers the level at which the student is and then start from there so that students can grasp concepts easily. Since the curriculum is competency-based and is differentiated, therefore it allows students to catch up to the current curriculum.

6. Lesson Plan Format: Scaffolded instruction, or the gradual release model, is broadly recognised as a successful approach for moving classroom instruction from teacher-centred, full group delivery to student-centred collaboration and independent practice. This model proposes lesson plans that include demonstrations and practice. Each lesson plan will be preceded by setting a Learning objective. The section Warm Up sets a buzz in the classroom. We propose a Guided and Independent Practice section has practice sessions that students need to complete to comprehend and absorb the topic. In the Guided practice section, while teachers may support the students, they will have the opportunity to work in pairs, groups or any other collaborative learning efforts. In the Independent learning section, students will have the opportunity to work together and present their work.

Active Learning -Science Hackathon

The Science Hackathon-2023 is a magical interaction with science that aims to enable school students to explore science and to apply scientific concepts to real-life challenges. The programme has a broader message of "everyone can think outside the box" encouraging participation of all students on issues that go beyond the syllabus. The programme aims to improve diversity and inclusion of all students who are interested in science and in fostering innovation, creativity, and creating lifelong learning in students.

Students from Classes 6-10 are encouraged to participate in a series of quizzes, projects and live challenges to explore fun facts, sustainable ways of life and amazing bio-diversity of the state they belong to.

Participants are divided into 2 level-based groups: Class 6 - 8 and Class 9 - 10

The Science Hackathon has 3 Round of contests:

#1 Quiz Round – An immersive online quiz round where students solved puzzles, answered questions and unlocked the many hidden treasures of nature and science.

#2 Live Challenge- This section included a 'Build your project' section where students participated in an immersive assignment where they ideated through solving critical and real issues. They were expected to share impactful solutions to environmental problems that plague their state.

#3 Final Meet-up –An offline in-person demonstration organized for the final contestants where the top three most impactful projects in each category will be selected and awarded.

The Science Hackathon in an integral part of Project-based learning that is promoted under Reach-Teach-Learn: A Road to Learning Enhancement Programme. Learning Enhancement Programme in all of India is limited in its capacity to Remediation. Reach-Teach-Learn: A Road to Learning Enhancement, designed and implemented in Meghalaya by Bhoomi Educational Consultancy aims to bridge learning gaps that students incur as part of their learning journey.

However, there is a clear indication that even when gaps are bridged, students are still vulnerable and can develop learning gap in their current classes. Reach-Teach-Learn goes beyond the remediation that is part of any Learning Enhancement Programme in the country.

Under Reach-Teach-Learn, students are encouraged to explore hands-on learning in all subjects where projects and interactive worksheets, adapted to the learning level of the students, are shared with them during the weekends and holidays to ensure that learning is consistent and continuous. To consolidate learning, students have access to App Neeve which helps them practice key concepts and competencies therefore ensuring that "Teaching" in the classroom results in actual "Learning". Student results are

continuously collected by the App Neeve which ensures continuous and comprehensive assessment without burdening the students.

A total of 500 students registered for the Science Hackathon. In the first round, 100 students appeared for the quiz. A total of 18 students were eligible for the second round after a careful and rigorous selection method. The culmination of the programme included a finale where 18 students presented their project and defended it in front of the judges.

Some of the prizes that students unlocked were as follows:

Category: Classes 6-9

1st prize: Cash Prize of Rs.10000/-, Smart Phone, Merit Certificate and Mememto,

2nd prize: Cash Prize of Rs. 7000/-, Merit Certificate and Mememto,

3rd Prize: Cash Prize of Rs 5000/-, Merit Certificate and Mememto.

All the participants were given a participation certificates and small gift-mementos.

The students were given a choice of following topics to work on: Water Pollution, Water Contamination and Conservation

The students were given two weeks to research their topics and develop their project ideas. They were also given access to mentors from Bhoomi Educational Consultancy who helped them with their projects. On the day of the hackathon, the students presented their project ideas to a panel of judges. The judges were impressed with the quality of the projects and the enthusiasm of the students.

The final presentation of the Science Hackathon was held on 21 July, 2023 at Sankardev College Auditorium, Lumshatsngi, Shillong. The event was graced by Shri. Rakkam A. Sangma, the Honourable Minister of Education, Govt of Meghalaya and the advisor to the government of Meghalaya Shri. H. M Shangpliang, IAS (Retd), as the guest of honour. The Deputy Director of Samagra Shiksha Abhiyan also graced the opening event of the day with lighting of the lamp ceremony and also with his welcome address to all the dignitaries, the students and participants for the hackathon, the jury members and parents who came to witnessed these great initiatives by the Samagra Shiksha Abhiyan-SEMAM, Education department and Bhoomi team.

Addressing the gathering, the chief guest said, “We must go expand our knowledge by modifying on our own, by not memorising but understanding, seeing how that knowledge can serve others using the possibilities that science and technology offers us.”

“This Science Hackathon is an eye-opener for the young children and its impact is very important for us to see for the first time which we have witnessed today. We must let it happen in different parts of the state. Our students are in need of such intervention and opportunities so that they can bring out their skills and their talents.”

Winners of the Hackathon

The winners of the hackathon were:

First prize: Miss. Nidhi Ghosh, Pine Mount School, Shillong

Second prize: Miss. Elvareen Lyngdoh Kynshi, Little Star English Medium School, Mairang

Third prize: Mr. Jeremy Mejop Rynghang, Govt. Boy's Hr Sec School, Shillong.

Recommendations

The following recommendations are made for future Science Hackathons:

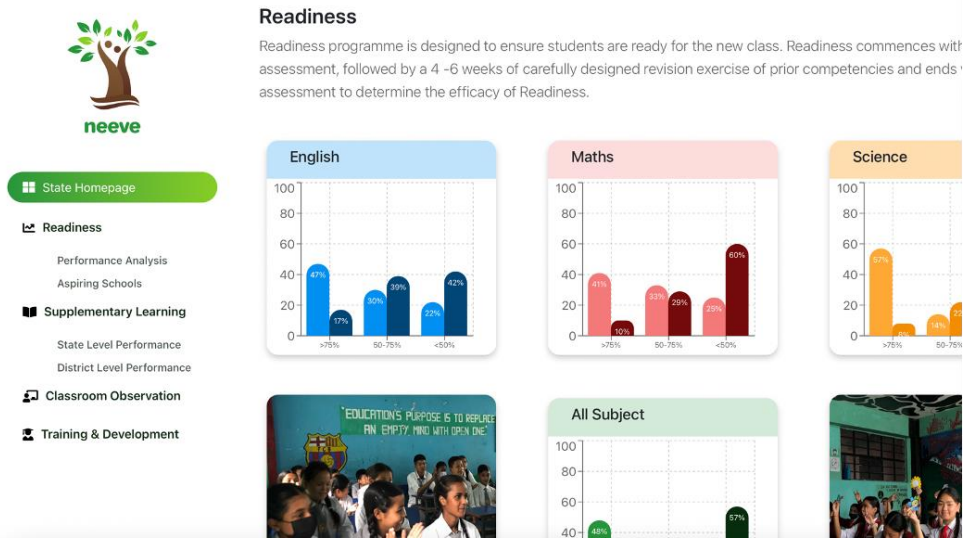
- Increase the number of participating schools from Garo hills and Khasi-Jaintia hills, Meghalaya.
- Provide more mentorship and support to students in developing their project ideas.
- Offer prizes for the top 3 teams in each categories of Elementary, Secondary and Higher secondary levels.
- Organize the hackathon in different parts of the state to reach out to more students.

The Science Hackathon was a huge success. It was a great opportunity for students to showcase their scientific skills and knowledge. The event also inspired students to think creatively and solve problems using science and technology. The hackathon also promoted a knowledge on the importance and wonders of promoting science through quality education in Meghalaya and inspired students to pursue careers in science and technology.

Reporting onTechnology Aided Education

Neeve Monitoring Module

State Dashboard



School Level

This section will capture the specifications and functionality for all the pages related to the above menus from the School Page

Functional Specifications

Function of the school level Monitoring Module (Neeve Monitoring) is twofold:
Input part – to take online surveys e.g., exam marks, readiness implementation,
Output Analytics part – to view results of all surveys with appropriate analytical representations

Neeve Monitoring Input – this is also referred to as Monitoring App as this web app is specifically created to carry out online surveys. Monitoring App can be accessed from the school homepage. Monitoring App 2 sections: Exam Portal and Survey Portal.
Exam Portal is used for uploading exam marks for Readiness Exams (baseline and end line) and also for routine school exams (Term Exams, Half Yearly and Annual).
Survey Portal is used for all other kinds of surveys for teachers and students. This may include Classroom observations, health records, infrastructure related surveys or RTL programme implementation surveys.
Survey inputs can be of following types:

- Numbers
- Multiple options – single or multiple input
- Anecdotal text
- Photo / Video

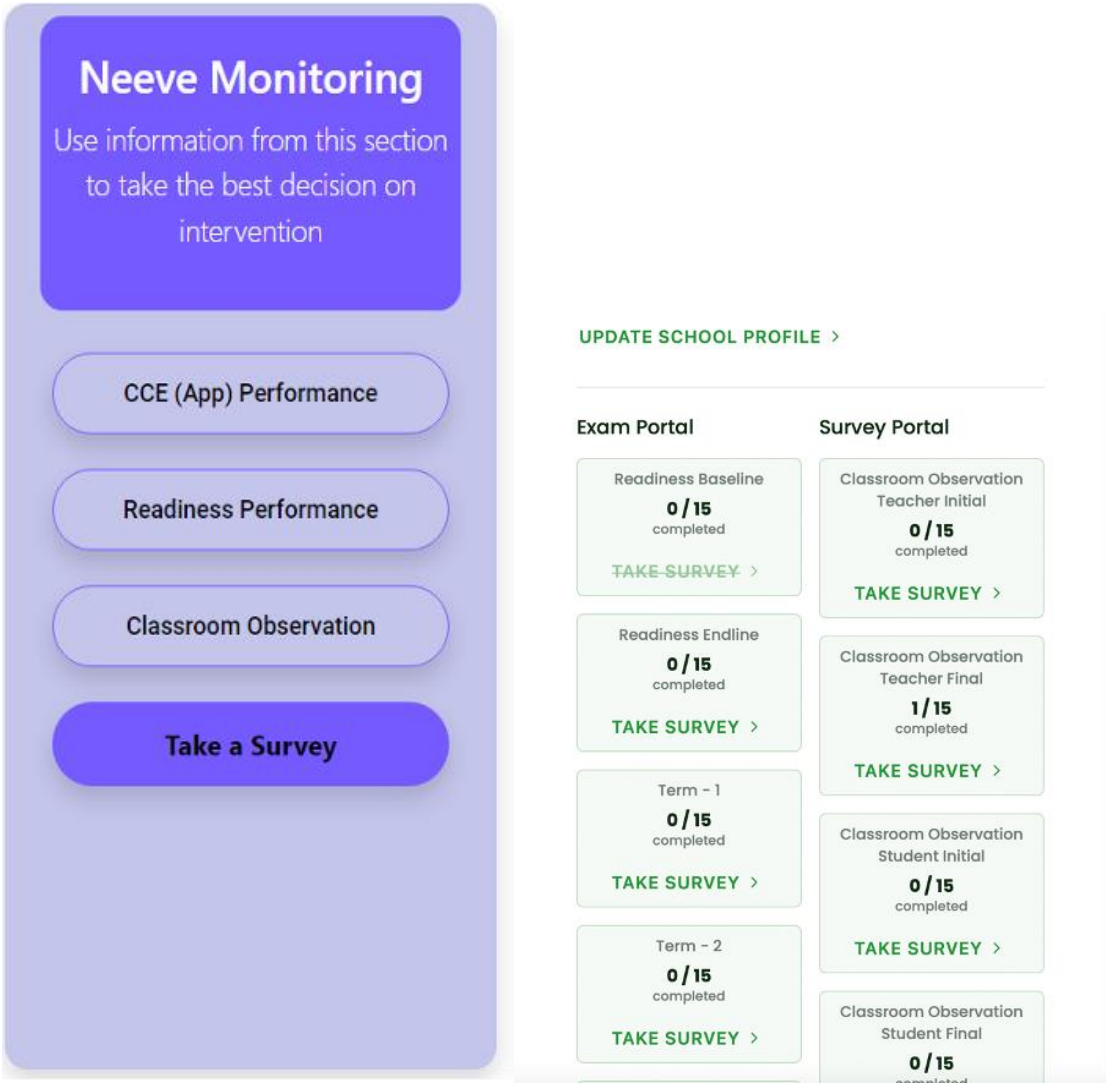
Survey tags can be of following types (all or combination of any number of tags):

- District & State
- School (UDISE)
- Class & Section
- Subject
- Teacher (to be registered)

Neeve Monitoring Analytics (Output) – Survey inputs are aggregated and displayed as actionable reports to schools in their Neeve School Portal. Different analytical tools are used to present data in the forms of graphs, charts, and tables that are easily interpreted. Analytics happens instantly as surveys are taken.

Describe the design and architecture of the Monitoring module.
Provide a high level diagram showing all the components within the Monitoring Module.
List the input device (if any) and output (if any)
List any constraints of the module, or possible good to have features that can be added

School Homepage



External Interfaces

User Interface

Describe the logic behind the interactions between the users and the software (screen layouts, style guides, etc).

Monitoring App has been designed to be clear and simple because it will be used by only educated mature people. The dashboard has 2 clear parts – Exam Portal and Survey Portal. Any experience teacher or education worker can understand the layout and flow by the look of the simple dashboard.

Monitoring App is accessed through Single Sign On (SSO) from School Portal so data from UDISE is prefilled for the school. There is no requirement of filling in basic information of the school (UDISE, name of school, District, State)

Survey questions are simple, and explained in plain English. Also, filling instructions, boundary conditions and limits (e.g., numbers only, 100 words, max 5 MB upload) are mentioned clearly inside each of the input fields to avoid any confusion that the surveyor may face.
Photo upload/video upload is allowed with one simple click.

The Analytics page of school dashboard is relatively more complex. Standard subject colour scheme is followed in all across Neeve platform – Neeve app and School Portal. Colour is graded from light to dark shades to denote lower to higher learning level.
English – Blue (to negate the bias that language study is feminine)
Science – Yellow
Maths – Light Red (again to negate the gender bias associated with Maths and encourage girls)

Bar graphs and pie charts are used for data interpretation and analytics. Data label for all graphs are displayed on the graph/chart itself. Analytics reports can be interpreted at a glance. All reports are downloadable as well.

Hardware Interface

Can be viewed and run on mobile device (smartphone & tablet), laptop and desktop
Network requirements – 4G or higher for mobile device
20 Mbps or higher in case of WIFI broadband
Communication protocols not used.

Software Interface

The Monitoring App platform is a web application which interacts with a micro-services backend to enable survey functionality.

The technical stack of Monitoring app includes the front-end of the application being created using React JS and the backend of the application being written in Node JS. The infrastructure stack includes dedicated VPS instance hosting the web application using the Nginx Web server as a proxy.

The backend of the application interacts with a No-SQL MongoDB database instance which is hosted on a separate VPS instance which is located inside a secured Virtual Private Network or VPN. This database instance is not accessible from internet IPs and has multiple firewalls preventing malicious intrusion to the same. Further, to ensure data sanctity, the whole VPS instance on which the database is hosted is backed up every week using automated backups.

The backend of the application is served as a micro-service on a PM2 instance running inside the same VPS instance as that of the frontend application. This allows for cost savings and optimised usage of the permitted infrastructure abilities.

Communication Interface

No embedded forms, emails, used

Non Functional Specifications

Security - Encrypted login neeve.io. SSO from Neeve School Portal onto Monitoring app, not accessible from outside of neeve.io
Hosting – Secure Server Digital Ocean https://www.digitalocean.com

Capacity
10,000 simultaneous data entry

Compatibility
Android 10.0+ mobile device (smartphone or tab), laptop and desktop
Best viewed on Android 13.0 Laptop or Desktop 1920 x 1080 @ 60 hertz or higher resolution

Reliability
Neeve Monitoring App – 99.99% uptime (scheduled maintenance taken up during after schools hours)
Neeve School Portal – 99.99% uptime (scheduled maintenance taken up during after schools hours)

Scalability
Highest workloads under which the module will still perform as expected:
Neeve Monitoring App – up to 10,000 data input per second
Neeve School Portal – Up to 100,000 Schools

Maintainability
Adding new surveys with existing input data type can be done without any major development work.
15 hours per month of maintenance work (without downtime) is carried out by a senior backend developer for smooth functioning of Monitoring app.
A complete upgradation to the latest version will be necessary by 2026 April or after release of 5 versions – whichever is earlier.

Usability
Neeve Monitoring App is extremely user friendly. The user can login with School UDISE and secure password. It needs few easy clicks to take a survey. Simple surveys can be completed under a minute. No formal training is necessary for working on Monitoring App, it is easy and obvious.

Neeve School Portal is a view only portal with Analytics reports. Navigation through the portal is simple and easy. Analytics reports are downloadable with one click.

Launch & Use of New Functions & Products

Class Promotion:

Class promotion set of APIs were developed for Neeve App. These APIs run to promote all the students registered on app Neeve to next class on command from backed.

Class promotion was (on App) was done in February 2023 without any downtime.

From users' perspective, the class promotion experience is as following:

1. Class promotion changes are effective WITHOUT any update ensuring no effort or communication is necessary for receiving the change.
2. Students do noy need to re-register or provide any details inside or outside the app, all identifying details (Name, class, school, DOB) are automatically transferred.

3. Students will receive next class's study material on App Neeve. E.g., a student who was in class 6 in 2022 and promoted to Class 7 ion 2023, will receive class 7 courses on Neeve after February 2023. They can start using the app for new class immediately.
4. The teacher will see new class list on Neeve School Portal. Analytics will be automatically update.

** in case a student is retained in the same class in 2023, that will be handled on case-to-case basis by technical team.

Neeve Monitoring Portal (app and dashboards)

Monitoring Portal (app and dashboards) was launched in 2 phases.

Phase – 1 Bulk upload of baseline performance data June 2023

In this phase, a major function was tested and handed over for usage. Baseline assessment result and classroom observations for the entire state was uploaded at one go. This is a function that is highly useful in case Monitoring app (the default input device) cannot be used for some reason.

No issue was reported during bulk upload of data – Baseline assessment and Classroom observations.

Phase – 2 End line assessment result entry by schools through Monitoring App July 2023

All schools used Monitoring app for entering endline assessment result. Using Monitoring app is easy, but a concise note was sent to the users for building confidence. The launch process went on smoothly. Data entered was reflected on school and state dashboard analytics page instantly.

1% schools (4 schools) reported an issue of difficulty in entering correct numbers. The issue was traced to hypersensitivity to touch of the input field which was promptly corrected. Data for schools that faced issues were correctly reentered.

NEEVE TRAINING PORTAL

External portal Graphy (https://graphy.com) has been chosen for conducting training of teachers.

Interactive training course with online quizzes and assignments have been prepared (SCORM Packages) and the course is hosted on Graphy's platform.

A teacher can click a link on Neeve School Portal and go directly to the course. She then needs to register herself by providing few basic information and start the training course.

The training course is made up of multiple modules that consists of interactive lecture delivery, online quizzes, videos, assignments (offline assignments to be uploaded for review).

After successful completion, scoring qualifying marks on the quiz and review of assignment, the teachers are awarded certificates.

All data related to training, number of trainees, average score and certificates are displayed on State Training Dashboard.

State Level – New State Dashboard

This section will capture the specifications and functionality for all the pages related to the above menus - from the State/Administrator Page

Functional Specifications

Analytics on State Dashboard – Surveys are analysed in detail, analytics presented in state dashboard for viewing of the administrators. Every survey has its own analytics page where input data is compared with standards or past records. Analytics is represented in forms of actionable tables, graphs and charts. State dashboard analytics is available for each individual districts as well as for the entire state in aggregated form – for every exam and every survey on the Monitoring App.
State dashboard analytics is generated automatically an instantly as the surveys are taken.

Provide a high level diagram showing all the components within the Monitoring Module.
List the input device (if any) and output (if any)
List any constraints of the module, or possible good to have features that can be added

External Interfaces

User Interface

Describe the logic behind the interactions between the users and the software (screen layouts, style guides, etc).

Hardware Interface

List the supported devices the software can run on, the network requirements, and the communication protocols used.

Software Interface

Describe the connections between the module and other software components, including frontend/backend framework, libraries, etc. List the versions of different components used.

Communication Interface

Any embedded forms, emails, used

Non Functional Specifications

Security

State Dashboard Login credentials are encrypted

Capacity

Describe the current storage used and anticipated future storage needs

Compatibility

Best viewed on Android 13.0 Laptop or Desktop 1920 x 1080 @ 60 hertz or higher resolution

Reliability
State Dashboard – 99.99% uptime (scheduled maintenance taken up during national holidays)

Scalability

10,000 pages on State Dashboard – completely scalable

Maintainability
Describe how the module is structured to ease maintainability or any constraints

Usability
Describe how easy it is for end-users to use the module

Any other details

Communication interface
SMS Gateway
External service provider – 2Factor https://2factor.in
Networks supported – BSNL, Jio, Vodafone
SMS OTP
SMS OTP price - ~30p (10,000 OTP)
SMS Header registration – OWLSKP

Conclusion

Reach Teach Learn(RTL) is unique in two ways. Firstly, it completes the loop of each small processes and steps. None of the parts of RTL can be called standalone. The outcome of one process feeds into another strengthening the processes as it progresses. starting from larger parts of the programme like Student Readiness to app practice - it has its analysis and feedback that either supports the part itself or the next process. Secondly, RTL supports and connects all stakeholders of education from students to the top administrator. There is a continuous flow of information connecting all levels that is automatic and is done without any effort. This flow of information helps in timely intervention at all levels. Any decision with classroom strategy or a state-level policy, or backed by authentic, real-time data. Following are the outcome of the Reach teach learn programme.

- Reaching Students: Reach children who have learning gaps and are in danger of dropping out of the system.
- Active Learning: Ensure active learning through projects and hands-on teaching-learning materials to encourage students to continue learning in groups and pair. To encourage creative thinking in students.
- Reaching and Teaching Students through quality resources: Virtual Resource Support for teachers to access a large number of resources that can be used in class. Ensure that students and teachers have quality learning resources.
- Monitoring learning: Learning monitored through the Monitoring App. Ensure that teachers use students' data to make the connection between learning levels and the instructional decision for groups of students.
- Home based learning: Self-Learning is encouraged through sharing of weekend assignments and through App practice so that students keep practicing key competencies and do not develop learning gaps.

- Measured Impact in Education: Analysis of student learning level continuously to ensure that students achieve grade appropriate learning levels in Science, English and Maths.

In the post-Covid world, student support will be key to ensuring that learning gaps that had been created for disrupted academic session are filled and students continue to learn new things. Classroom education along with supplementary support at home will go a long way to ensure that a complete learning ecosystem is available for the students.

While Remedial Education bridges the learning gaps, Student Enrichment Programme ensures that support received by students is cohesive, integrated, and continuous. Active Learning integrates 21st Century Skills to a competency-based curriculum, which is recommended in NEP.

The teachers are supported by a series of programmes and resources to build capacity to embrace the change.

Finally, feedback, sharing good practices and data-based analysis of student's performance complete the full circle of the programme ensuring that State has the capacity to course correct as desired.