Sindh Early Learning Enhancement through Classroom Transformation (SELECT)

Component III

Improving System Capacity for Effective School Leadership and Management Support

Software Development of Student Attendance Monitoring and Redressal System) – Terms of Reference

(With outline on Execution workflow, stakeholder roles & details)

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SUMMARY OF THE TERMS OF REFERENCE

The Terms of Reference are to procure the services of a Software Development firm to support the SELECT PMIU to develop and deliver Student Attendance Monitoring and Redressal System for schools under the intervention of the project, focusing on (i) data-and evidenced base students attendance monitoring/tracking (ii) technology-based approaches to redressal for student absenteeism and limit dropouts.

The selected firm will be engaged for 18 months to develop Software for Student Attendance Monitoring System, collect data of enrolled students through app, develop Students' Unique ID, develop operating manual of software and provide Application Users training.

The firm will report to the SELECT PMIU and carry out required meetings with stakeholders to clarify requirements.

1. SELECT PROJECT BACKGROUND AND OBJECTIVES

(a) Project Background

The Sindh Early Learning Enhancement through Classroom Transformation (SELECT) Project encompasses a multi-pronged approach towards improving the quality of both teaching and learning practices in primary education, with a particular emphasis on foundational reading in grades 1 through 5. The project comprises a series of focused and flexible implementation strategies, targeted at the school and meso- levels (personnel and systems at the school, taluka and district levels). The project supports improvements in the transition from primary to elementary school, as well as a reduction in dropouts through targeted student attendance redress procedures. Desired Project outcomes would eventually contribute to reductions in learning poverty and in the number of out-of-school children.

(b) Project Overview

Project Objective	To improve reading skills of early grade primary students and increase student retention in primary schools, in select districts.
Project Cost	US$ 154.76 million. US$ 100 million from IDA and US$ 29.9875 million from the Education Sector Program Implementation Grant (ESPIG) and US$ 24.775 million multiplier grant (MG) of the Global Partnership for Education (GPE).
Component 1	Transforming teaching practices in the early grades: • Subcomponent 1.1: **Implementation of a Continuous Professional Development (CPD) model for improved literacy skills in the early grades** • Subcomponent 1.2: **Behavioral nudges for improved learning** • Subcomponent 1.3: **Technical Assistance for transforming teaching practices**
Component 2	Developing an effective learning environment – by school up-gradation to elementary level and school rehabilitation through refurbishing of existing classrooms and adding new classrooms to existing schools, provision of furniture, and adequate WASH facilities by actively pursuing eco-friendly materials and designs
Component 3	Improving system capacity for effective school leadership and management support

	• Subcomponent 3.1: **Establishing a technology-based student attendance monitoring system.** • Subcomponent 3.2: **TA and capacity building for school leadership and local education office management to mitigate student dropout**
Component 4	Technical Assistance and Project Management
Project location (Districts)	Badin, Ghotki, Jacobabad, Kambar Shahdadkot, Kashmore, Mirpurkhas, Matiari, Sanghar, Shikarpur, Sujjawal, Tando Muhammad Khan, Thatta

This consultancy will support Component 3 of SELECT; the outputs from the assignment will, however, cross over with Component 1, and knowledge of Component 2 will be valuable to delivery of the ToR.

Component 1: Transforming Teaching Practices in Early Grades

Component 1 of the project is focused on transforming teaching practices in the early grades through the implementation of a continuous professional development (CPD) policy aimed at improving early grade literacy skills, with specific emphasis on Grade 1-5. Main outputs within this component include the following:

(i)   implementation of the CPD training for teachers and regular follow up through Guide Teachers and Subject coordinators assigned at each Cluster and School level respectively.
(ii)   capacity development for the teacher training institutes through third-party providers;
(iii)   implementation of interactive audio and video instruction (IAVI) and teaching and learning materials;
(iv)   implementation of literacy teaching and learning materials for primary education, including scripted lesson plans, leveled-reading books for students; and
(v)   implementation of the upgraded comprehensive CPD program and monitoring of student learning outcomes improved literacy skills.

The content developed under CPD will address gender biases through the intervention training for teachers, learning content for students, and through engagement strategies with parents. This effort is aimed at reducing gender stereotypes that may be biasing the demands for girls' education or their learning capabilities along with behavioral nudges interventions from classroom to community levels. Implementation of CPD Policy will be carried out through Guide Teachers and Subject Coordinators assigned in each cluster and Schools under the Project.

Active and effective engagement of the School Leaders (Head Teachers / Head Masters) in implementation of Continuous Professional Development (CPD) Model in facilitating the Guide Teachers and Subject Coordinators in the application of classroom observations, and assessment practices including formative and summative assessment strategies during each of the learning cycles. The CPD model is based on a cluster-cum-school based approach. The professional development activities under the framework will be managed through a **central primary/elementary school** (referred as Cluster Hub School in the framework). The School Clustering Policy by the SELD defines a school cluster as group of schools close and accessible to each other. The distance varies with respect to number of schools of various types, sizes, and levels within the cluster. CPD will be delivered through blended mode: face to face and remote trainings

To support improved student well-being and mitigate future potential risks related to students dropping out, particularly girls, the project will also utilize behavioral nudges. These nudges can positively influence how teachers, students, headmasters, and parents interact. The project will pilot a school-based behavioral intervention that will help students recognize that their abilities and skills can change and grow and will focus on key skills such as student efficacy and self-management. The intervention will focus on reading skills to support increased learning outcomes. The content developed under CPD will address gender biases through the intervention training for teachers, learning content for students, and through engagement strategies with parents. This effort is aimed at reducing gender stereotypes that may be biasing the demands for girls' education or their learning capabilities.

The delivery will be supported by the following government institutions: Provincial Institute for Teacher Education (PITE), Sindh Teachers Development Authority (STEDA), and the Directorate for Curriculum and Research (DCAR). The roles of each organization in CPD is as follows:

PITE: The implementing and academic supervision wing

- Responsible for selection of MTs, GTs, SCs
- Development and Review of Teacher training Material
- Arrange Face to Face training program for teaching workforce
- Arrange School Base coaching for Teaching workforce
- Academic supervision
- Plan CPD cycle

STEDA: Quality assurance

- Approval of Teaching material
- Quality assurance of training program
- Monitoring

DCAR: Assessment and student learning material

- Implementation of formative assessment
- Support in EGRA evaluation
- Student learning material review and development

Component 2: Developing an effective learning environment

This component aims to improve the physical learning environment in selected upgraded primary schools and to support the improved teaching and learning aims set out in Component 1. The main aim of this component is to establish environments conducive to learning that maximize available academic/instructional space and create synergy with the pedagogical approaches proposed within Component 1. The improved learning spaces aim to attract more students to come to school and increase the quality of learning time that they spend at school. The improved learning environment is especially important for girls' enrollment for two reasons: (a) WASH facilities have been demonstrated to be critical for girls' attendance and retention and (b) availability of elementary grades in the same community is important for girls for social and security reasons and it also helps to prevent their dropout in early grades. Under this component 600 schools will be upgraded from Primary to elementary level, out of which 50 schools will be upgraded to Secondary level. Upgrading to elementary schools will enable (a) increased retention rates from grades 5 to 6, (b) increased retention rates in lower grades by demonstrating the potential for future study opportunities, and (c) creating a dedicated headmaster position with the power of the Drawing and Disbursing Officer (DDO) in upgraded schools, which will enable more effective implementation of Component 1 and 3 activities. RSU has prepared a long list of schools that are designated as the cell hub schools for Component 1, which typically have sufficient base infrastructure (to rehabilitate) and already offer primary education up to grade 5. Once they have been upgraded to elementary schools, the GoS will deploy the requisite elementary schoolteachers and headmasters.

Component 3: Improving system capacity for better school leadership and management support:

This component aims to achieve the following:

a. **Alignment of roles of education management:** Clarify and align the role of, and relationships between, local education management (PMIU SELECT>District>Taluka Education Officers>Cluster Heads/Head Teachers) and school management committees towards school-level support, and to support the development of a school leadership cadre from among these officers. The school leadership cadre will support interventions 'b' through 'e' discussed below.

b. **Data analysis and targeted approach for instructional support and resource allocation:** Using an integrated education database system and working with district and taluka education officers, the component will support school leaders, along with headmasters, Guide Teachers

and Subject Coordinators, to identify and then focus instructional support and financial resources towards the students, teachers, and schools with the highest needs. This will include the existing teacher attendance system, formative assessment system, Human Resource Management database, the new student tracking system and other relevant database systems.

    c. **Unique Student Identifiers and student tracking:** this component will support the development and utilization of an automated system to generate unique student identifiers, and use them to track and report student attendance to support retention and limit and redress dropouts

    d. **Focus on proactive drop-out redressal:** The component will support education managers to assist teachers and parents to proactively identify and address the factors that affect students' in-school performance and risk of drop out, particularly for girls.

    e. **Improve girls' retention in schools:** This component will introduce gender specific interventions aimed at improving student experience and drop out mitigation particularly for girls.

The subcomponents and activities under this component are as under:

Subcomponent 3.1: Establishing a technology-based student attendance monitoring system

3a(i). Generation of Unique Student Identifiers: To measure student attendance, reduce potential dropout and track student transition to other government schools, students will be given a unique student identification (ID) number. The process of generation of unique student IDs will be conducted through third party support. The unique student ID number would allow for more uniform and systematic student identification and tracking, especially whether students complete the full primary cycle in one school or move and transfer to other schools in the province.

3a(ii). Development of a tech-based Student Attendance Monitoring System: An app-based system of individual student attendance monitoring will be developed and implemented through the introduction of tablets or smartphones, with the possibility of scaling up beyond SELECT project schools. A technology firm will be hired to support the development, piloting, and implementation of student tracking system.

3a(iii). Real time student identification and report generation: The new attendance monitoring system for students will allow for real time and systematic long-term identification of problematic student attendance and enrollment patterns and generation of reports identifying students at various levels of risk of dropping out.

3a(iv). Tailored prompts for Head Teachers, teachers, and parents: The student attendance tracking app would be used to targeted prompts to nudge teachers, parents and subsequently headmasters, to increase targeted support to students at risk of dropping out.

3a(v). Targeted follow up visits by district and taluka officials: The app-generated student attendance reports will be shared with the Directorate General of Monitoring and Evaluation (DG M&E) and will be used by the District Education Officers (DEOs) and Taluka Education Officers (TEOs) to plan targeted follow up visits and monitoring of school-level efforts to address low student attendance.

3a(vi). A student attendance "escalation matrix": This will be developed to help teachers and headmasters in their efforts to use the available reports to take proactive mitigation measures.

3a(viii). Active involvement of SMCs: Parents and communities, through School Management Committees (SMCs), will be actively engaged with the TA support in the dialogue for student attendance monitoring and promoting learning and retention, ensuring citizen engagement in the school activities.

*3a(ix). Gendered analysis of attendance patterns***:** Specific attention will be given to monitoring girls' attendance patterns to proactively identify and mitigate girls at risk of drop-out at an early stage. This will be accompanied with a gendered analysis on the underlying drivers for poor student attendance and drop-out.

Subcomponent 3b: TA and capacity building for school leadership and local education office management to mitigate student dropout:

This subcomponent provides TA and capacity building to school leadership and local education management through a combination of third-party trainers and Teacher Training Resource Centers/cluster hub schools that would focus on:

3b(i). Student attendance tracking: Implementation of the unique student ID creation process, Implementation and usage of the technology based SAMRS (including tracking of student attendance, analysis of attendance patterns and remedial actions) and the implementation and student attendance monitoring and redressal policy and procedures as notified by the SELD.

3b(ii). Basic administration of school clusters: managing basic administration of schools, academic monitoring and reporting, financial management/public financial management, and instructional training for the improvement in the new school clusters as per notified cluster policy, 2021.

3b(iii). CPD implementation in school clusters: implementation and facilitation of the CPD model and new student assessment practices; and analysis and reporting of student learning outcomes.

3b(iv) Student transfers and transitions: managing student transfers from satellite to upgraded elementary schools and successful transition from Class 5 to 6.

Along with relevant institutions within SELD, the following consultants will be hired to support delivery of Component 3:

1. **Technical Assistance firm for the development of technology-based student attendance monitoring system:**
   i) Development of a technology-enabled student attendance monitoring system and unique student IDs, and procurement of tablets for schools;
   ii) Recording and analyzing the patterns and causes for student drop-out by gender, including an analysis using student attendance data; and
2. **Technical Assistance Firm for Capacity Building of School Leadership and District Education Management:** Support to strengthening leadership functions through capacity building of school leadership; and introduction of the SAMRS in target districts. (To be procured through this ToR).
3. **Technical Assistance firm to monitor the uptake and implementation C1 and C3 initiatives.**
4. **Social Mobilization firm to support C1, 2 and 3 community mobilization and gender focused initiatives.**

The firm hired through this ToR will be required to coordinate with the firms identified in points 1, 3 and 4 above, and share requested material with them.

1 Scope Of This Assignment

The firm is expected to develop and deploy a software system that captures the process flow defined in this document. The system will provide access to all involved stakeholders using web/mobile access according to their respective roles. The system has a workflow to capture Parent department, concerned SELD wings, field activities up to ground level and an information reporting mechanism for the management users of the program to monitor the overall progress observing and reporting. Once the system is developed and internally tested for deployment by the firm, a complete Users training cycle will be done, with the PMIU SELECT identified resources, for end-to-end cycle.

The system development & software delivery is an interactive process between the software firm and PMIU SELECT. Each deliverable by the firm has an associated feedback/acknowledgement cycle by the PMIU SELECT. Once the software deployment is ready it is accepted by the PMIU SELECT and shall be made live. The software firm shall provide support during the first phase of this software rollout in first set of schools, any bugs or adjustments identified shall be adjusted during the period.

2 Overall Process workflow

The diagram below represents the overall workflow, key execution-level processes/sub-processes, and their inter-actions to be captured into the software system.
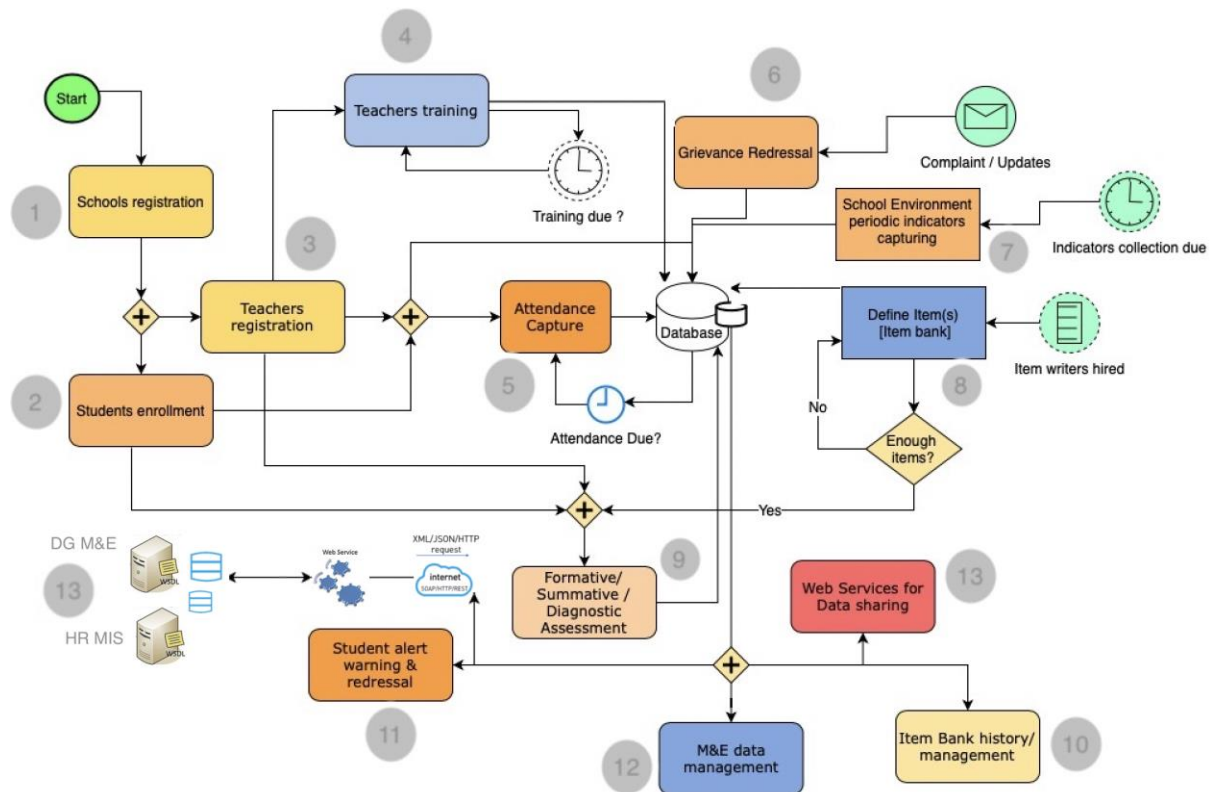
The cycle starts with setting the base data; which includes registering all the schools on the system as well as available teachers' data. Students' data in a prescribed format is loaded onto the system for all the available students. All newcomer students are also enrolled on the go. Admission/leave/transfer certificates are generated.

Teachers are trained and all training record is simultaneously updated into the training's module. Attendance is captured for both teachers & students. Manual, biometric as well as QR code-based attendance capturing are possible through the system. The data is synced with HRMIS as well as DG M&E for reconciliation / monitoring. The current teachers/school data is updated through HR MIS system using web-services. Trainings data related to teachers is updated into teachers training modules. A grievance redressal system is there to record and resolve the complaints/updates. Periodically (on specified interval) from each school environmental indicators are captured and recorded into the central system to be used with attendance redressal inputs.

An item bank module is established into the system which helps define items for different types of assessments to be done on students. Those assessments are done, at least, on monthly basis on each school. The attendance data, assessment data and other data in the system are used to identify possible dropouts and resolve the situation beforehand to minimize the dropouts. A M&E module is also part of the system which helps generate sample based data for monitoring and also enables recording periodic monitoring reports on different aspects of project rollout and quality of implemented processes.

2.1 Type of Users in the system

There are nine execution level stakeholders for the work:
1) PMIU SELECT (Admin User/Provincial Level)
2) Component Lead Consultant PMIU
3) DG M&E (Districts level monitoring)
4) DG HRMIS
5) Directors School Education (DSE) (respective regional level supervision)
6) District Education Officers (DEO) (respective district level supervision /monitoring)
7) DEO (respective district level monitoring)
8) Taluka Education Officers (TEO) (respective taluka monitoring)
9) Executive Director Sindh Teachers Education Development Authority (STEDA)
10) Provincial Institute for Teachers Education (PITE)
11) Director Directorate of Curriculum and Assessment Research (DCAR)
12) Head Teachers of the Schools (Respective Schools attendance capturing)
13) Guide Teacher, Subject Coordinator (respective school progress updates regards to students assessment)
14) Master Trainer

PMIU SELECT (Overall Progress Monitoring):

User is responsible for overseeing and monitoring the overall progress of the project of all modules. They have access to comprehensive information and dashboards that provide an overview of the progress at various levels, including all components, regional/directorates, districts, talukas, and schools. They can analyze data, generate reports, and make informed decisions based on the system's information.

Component Lead Consultant PMIU:

User is assigned to monitor a specific component of the project module. They have access to component-specific data, reports, and dashboards that allow them to track and assess the progress of their assigned component. They provide regular updates to the PC PMIU SELECT and collaborate with the other stockholders to ensure smooth implementation of their progress.

DG M&E Department:

User is assigned technical persons of DG, M&E for overall monitoring & CMO to visits & Supervisory role on district level, Monitoring Assistant will visit assigned schools to validate attendance. The DG M&E system will be shared with attendance collected in the field for quarterly validation. The data will be shared through web-services. The sharing will be as required by DG M&E, sample or full.

DSE (Supervisory role on region and placement of needed staff in schools):

These users belong to specific directorates overseeing multiple districts. They monitor the progress of the project within their respective region. They have access to respective regional data, reports, and dashboards to track the implementation and address any issues or challenges. They collaborate with other stakeholders, such as component lead consultant and DEOs, to ensure effective coordination and progress.

DEO (respective district level access & monitoring):

District Education Officers (DEOs) are responsible for monitoring the project at the respective district level. They have access to district-specific data, reports, and dashboards to track the progress within their districts. They work closely with other stakeholders, such as directorates, TEOs, and HMs, to ensure smooth implementation, address issues, and provide necessary support.

TEO (respective taluka level access & monitoring):

Taluka Education Officers (TEOs) monitor the progress of the project at the taluka level. They have access to taluka-specific data, reports, and dashboards to track the implementation and progress within their talukas. They collaborate with DEOs, HMs to ensure effective implementation and resolve any challenges.

HM (Schools progress updates/Entry level user):

Headmasters (HMs) are the entry-level users responsible for updating the progress of their respective school. They have access to the system to input children and schools' data, update information, and provide regular progress updates. HMs are also responsible for monitoring and reporting daily student attendance.

SELD Wings (STEDA/DCAR/PITE):

This User will further provide teacher training and learning material which will be conducted by STEDA/DCAR/PITE/TTIs & all teachers, and where the status of learning completion can be document. This module will allow DCAR, PITE, STEDA to upload various learning resources for teachers also publicly available to download and use including instructional manuals, audio, videos, test formats, presentations etc. A sub-module will be added for STEDA, DCAR and PITE enabling them to enter the trainings status of each teacher and this module link with student assessment and school learning environment.

Master Trainers:

Master trainer users will be nominated for trainings and helping users for teachers in the field.

These types of users have varying levels of access, responsibilities, and roles within the system, allowing for efficient monitoring, reporting, and collaboration across different levels of the project.

60 users to be trained for using the modules. 60 Master Trainers for SELECT Districts – Min two in each Districts nominated by DSE (24), two M&E Assistants in each district nominated by DG M&E (24) and 12 LSU members 1 in each district nominated by CPM-RSU (12) – are to be trained.

World bank team

The user can view overall graphically progress/reports presented on dashboard (provincial, district & taluka level, module wise).

Secretary SELD (School Education & Literacy Department)

The user can view overall graphically progress/reports presented on dashboard (provincial, district & taluka level, module wise).

2.2 Reporting hierarchies defined in the system

There are different execution & interaction hierarchies in the system for workflow & reporting.
1. Geographical hierarchy
   - Province > Division > District > Tehsil > UC > Cluster > School > Community
2. Time hierarchy
   - Overall > Decade > Financial Year > Quarter > Month > Week > Day

3. Student Unique ID, Attendance monitoring & redressal system categorization hierarchy
   - PMIU SELECT/M&E > DSE > DEO > TEO > HT > Teacher > Community
4. Teachers training and learning material module users hierarchy
   - PMIU SELECT /HRMIS > PITE/DCAR/STEDA/TTI
5. Student Assessment and School Environment & Learning module
   - PMIU SELECT / M&E > DSE > DEO > TEO > HT

6. Item bank Module
   - PMIU SELECT / DCAR > DSE > DEO > TEO > HT > Teachers > Students
7. M&E PMIU
   - M&E PMIU / Component Leads PMIU

3   Processes & the functionality required

Different processes which system shall cover are defined in this section. These processes are to be automated using mobile as well as web application. The mobile application shall enable offline data collection and geo-tagging all collected data.

3.1   Base data setup

The SELECT program already have base data of schools in the system and the teachers working in the schools.

The new system shall have the base data setup from already existing database at PMIU. The database includes all the schools as well as initially targeted schools (around 600).

The schools shall be loaded into the system. The teacher's data already available shall be added to the teachers module. Linking to the respective schools.

This data is linked here through other department/system for continuous updates – including teacher recruitment, termination and trainings. The related webservices for submitting data and receiving data at PMIU end is to be developed and deployed for ongoing updates.

An interface for editing school data or adding (new schools), merging or suspending schools should also be provided to the PMIU to perform the needful. Similarly, an interface for editing the teachers data should also be provided.

A base calendar for school is loaded into the system for each school by default. That calendar have all the holidays, study days as well as exam & result day. The base calendar should be editable to reflect actual situation on ground. Year on Year.

3.2   Student Enrolment (Unique ID Generation) Module:

The firm shall develop a student enrolment module and associated ID database, with unique identification codes.

i.   Collect and digitize data on enrolled students, School, District, taluka, UC, address, Class, NADRA Form-B IDs, and parent/guardian information.
ii. Existing School SEMIS Code, Admission Year & sequential number in series e.g. SEMIS YY XXXX (UNIQUE ID 18 digit).
iii. Enable individual student reports based on the generated IDs.

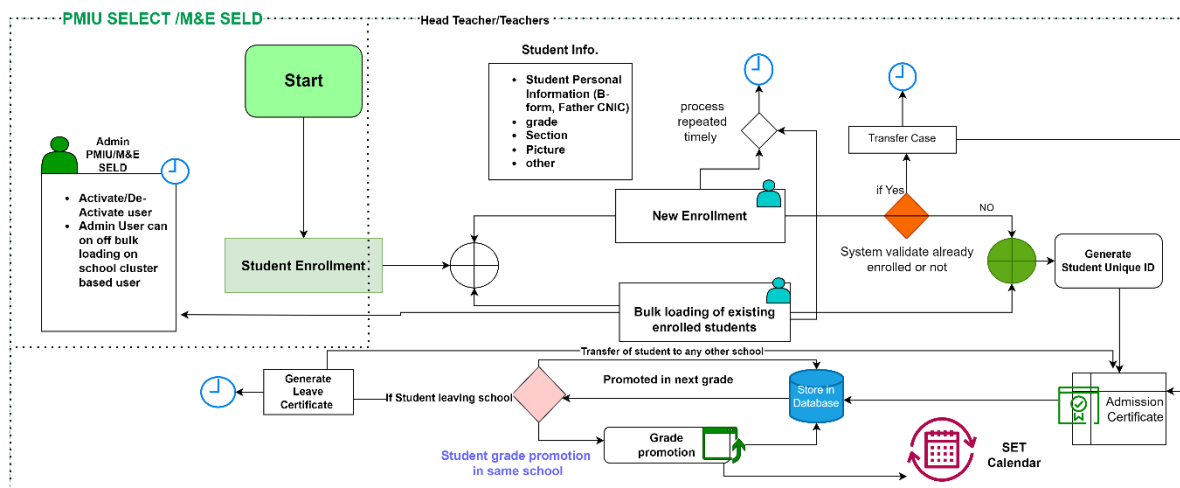Student Enrollment module (with Student Unique ID Generation):

Figure 1 Student Unique ID

- Student enrollment is divided into two parts:
    - New Enrollment. Individual student specific.
    - Bulk loading of existing enrolled students. See annexure for fields.
- Student new admissions are handled by HM/Teachers, and bulk entry is imported initially by a firm (on initially identified schools) and then handed over to HM/Teachers. The data for import has to be made available by PMIU in a pre-specified format (in excel sheets). The format is added as Annex-student enrollment. The data shall be uploaded into the system by firm for the initial project rollout. The uploading facility (user role) shall be extended to field user too for bulk data uploading where possible. Appropriate well defined error messages are displayed for missing / incomplete data in the import list. The data is also checked for already uploaded data & duplication is eliminated by proper messaging. All data should be uploaded using a staging approach. While data is uploaded into the system Unique student ID is assigned to each student.
- For new admissions at the school, the system validates whether the student already exists. If the student is already enrolled, it will be considered a transferring case. If the student is new, their new student ID will be assigned, and an admission certificate will be generated. The key fields for admission are defined as Annex - Student enrollment.
- Once the student in enrolled into the system, an admission certificate is generated, all students are shared back with school admission certificate – who have complete information including the B-Form & parent CNIC. If parents have mobile (WhatsApp) / email. The certificate softcopy shall be sent to them. This feature can be turned on/off by admin for specific as well as all schools.
- Additionally, the system will provide the functionality to generate school leaving certificates for students who intends to leave.
- Each student has an identification card enabled into the system – which is printer friendly. It has student picture where available, Name, Class, Unique student IT, school name and printed QR code having the unique student ID
- The admin user has the ability to activate or deactivate users, assign roles, and manage bulk loading data user base.
- Student grade/class promotion functionality is available for manual processing, specifically for students who have passed exams and remain in the same school.
- Implement data protection protocols to ensure the security and confidentiality of student information, while maintaining a feedback loop for redress measures.
- Conduct pilot testing of the system and incorporate lessons learned and suggested changes to improve its effectiveness and efficiency.
- The system allows for the setting of a calendar for student grade promotion.

- The calendar can be edited and updated by the school as needed.
- The calendar defines the specific dates and criteria for student grade promotion.
- Schools have the flexibility to customize the grade promotion calendar based on their academic year.
- School administrators or designated personnel can access the system to make changes to the grade promotion calendar.
- The grade promotion calendar ensures transparency and consistency in the promotion process, allowing schools to effectively manage student progress and academic transitions.

3.3   Attendance Capturing (student/teachers) Module:

The Student Attendance Tracking Module is designed to capture the daily attendance of students and teachers. It provides a systematic way to record and analyze student attendance data, allowing for better understanding and management of student attendance patterns. Here is a detailed explanation of the module:

Stakeholders involved

- PMIU SELECT
- Technical persons of DG, M&E
- DSE
- DEOs
- TEOs
- HT will Ensure capturing daily attendance of teacher and also monitor student attendance,
- Teachers: Ensure capturing daily attendance of student, assessments etc.
- CMO: visits &Supervisory Role on district level
- MA: School visits to validate attendance (on data submitted to DG M&E.)

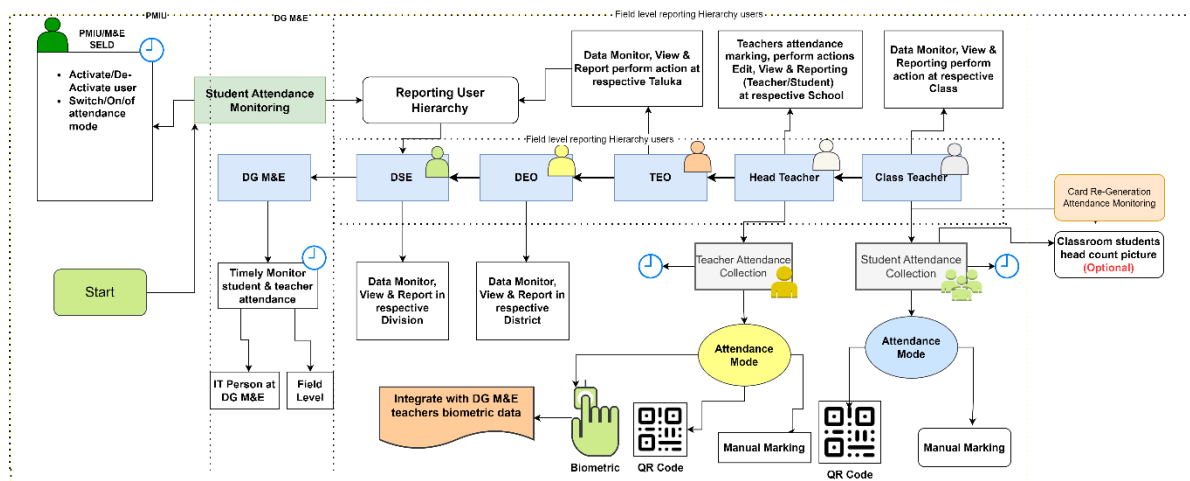### Flowchart Student Attendance monitoring:

Figure 2- Attendance monitoring

- The application collects attendance for both students and teachers.
- The admin user has the authority to activate or deactivate users, assign role and change the attendance mode between manual or QR code-based or biometric. Specific schools and/or for all students,

- Real-time Monitoring: The system will provide real-time visibility of student attendance, allowing administrators at each level (such as HM/TEO/DEO/DSE/M&E/PMIU) and relevant stakeholders to view attendance status and trends across different time periods (e.g., daily, weekly, monthly) and geographies.
- The reports can be summarized based on HT/class teacher, school, or geography. The summary will display current regular/absent numbers, and users can click on the summarized numbers to expand the details.
- The hierarchy of users includes PMIU-SELECT, DG M&E, DSE, DEO, TEO, Head Teacher, and Class Teacher.
- Each user in the hierarchy has access to their respective attendance data on the dashboard.
- Before marking student attendance, teachers will upload a picture of the classroom for headcount verification (admin *settable on/off school/tehsil/district wise*). This image to be stored centrally.
- Once synced to central server the field collected historic data from tablets/field application should be cleaned to keep systems & hardware efficient.
- Students attendance is marked by class teachers in their respective school. The class teachers have own login accounts.
- The attendance data of teachers will be synced with the DG HRMIS system, which serves as the central database for teacher-related information.
- The student attendance data shall be shared with DG M&E, for sample-based monitoring. The system will provide functionality to fully sync all attendance data of selected schools on demand basis.
- Teachers attendance can be marked using a manual system, QR Code or a biometric system.
- Head teachers are responsible for marking and monitoring the attendance of class teachers/teachers at their respective schools.
- Class teachers/teachers are responsible for marking and monitoring the attendance of their respective classes.
- The Director-General (DG) of the M&E Department will conduct quarterly visits to schools for attendance monitoring (based on the sample provided to them through automated webservices).
- The DG M&E shall have access to the dashboard and view attendance reports across the hierarchy.
- The module will generate comprehensive reports and analytics on student attendance, including overall attendance rates, patterns, and trends. These reports can be customized and filtered based on various criteria, such as grade level, class, or specific time periods.
- All reports should have a functionality to sort & filter on selected columns.
- School calendar year to be defined into the system with all present and absent days. This should be updated based on ground reality.
- The module will prioritize data security and adhere to privacy regulations to protect the sensitive information of students and maintain confidentiality.

3.4 Student alert warning and redressal mechanism module:

Student Alerts & redressal system shall highlight all students lagging on attendance for a specified period as defined below. The alerts shall help generate actions to be taken by the system itself (in automatic way) or by the specified user(s). This shall help resolve the student attendance issue on individual level.

However; for collective attendance cases which are beyond individual level issues and are related to bigger scope are handled by generating alerts for schools or teachers' level corrective action. Specified user defined in the system are provided with the capability to generate school or teacher specific alerts based on reports involving school & teachers information (from the system) alongside absent students' summaries. Those alerts are forwarded to concerned stakeholders for resolution.

Stakeholders involved: -

- PMIU SELECT
- DG M&E
- DSE
- DEOs
- TEOs
- Cluster Head
- HTs/Teachers
- SMCs
- Parents

Flowchart Student alert warning and redressal System:
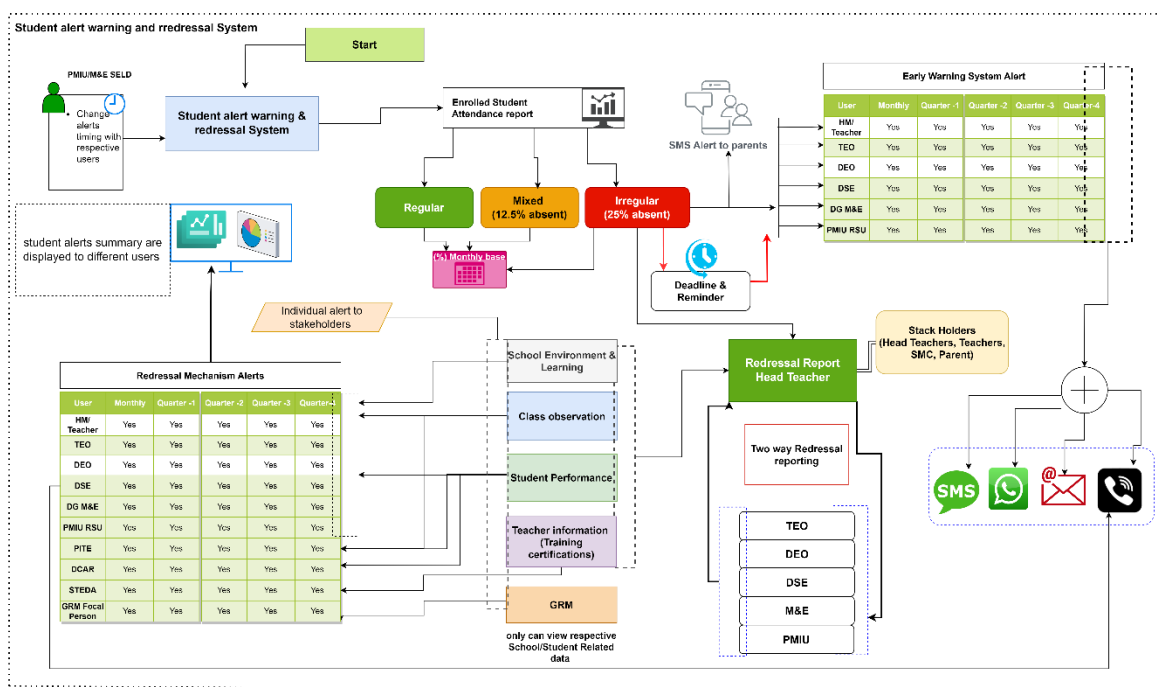
Figure 3 *Student alert warning and Redressal System (SAMRS)*

Following is the expected steps & flow of the system with salient features details:

- The attendance of enrolled students will be reported & summarized, and automated alerts will be generated for individual students based on their attendance patterns. If a student is absent for 12.5% (3 days) or more (randomly or regularly) of the total school days in a month, they will be highlighted in the yellow category, and an alert will be generated. If a student remains absent for 25% (6days) or more (randomly or regularly) of the total school days in a month, they will be categorized as irregular and highlighted in the red category. Alerts will be generated and sent to the respective stakeholders and parents. The alerts will have two types: informational alerts and alerts requiring corrective action. The limit generating these alerts are editable by admin user, the edits may apply to specific region/district/school or on entirety.
- There will be set deadlines for alerts and timely reminders to ensure prompt attention and action.
- Head Teachers, teachers, and SMC members will take physical action to address and report on irregular students. They will follow a defined redressal mechanism and communicate with stakeholders in the hierarchy, including TEOs, DEOs, DSE, DG M&E, and PMIU SELECT RSU.

System will show reports showing data from assigned school & sending alerts on lagging students/teachers/schools to the respective user.

- There will be two reporting mechanisms for redressal: top to bottom and bottom to top, ensuring effective communication and coordination between stakeholders.
- The system will use SMS/WhatsApp messages or make calls to inform parents and teachers about the student's attendance status and record corrective actions.
- A physical action performed by users (Head Teacher / Teacher/ SMC) in the system to be recorded, after some action is taken by the user to resolve absenteeism in the field. The action responses should be well defined in the system; and have a list of selectable reasons and a text box for remarks/comments against each alert. The list of reason should be admin controlled & editable (Add/Edit/disable).
- The system will highlight an alerts summary to specific users. The alerts will be categorized based on the urgency and sensitivity of the actions required. This will help users prioritize their actions, taking into account any delays, ongoing processes, or pending tasks.
- The reports generated by the system will have sorting and filtering capabilities, allowing users to easily navigate and analyze the data. Users can sort and filter the reports based on various criteria such as class, teacher, school, or geography.
- The reports will provide aggregation options, allowing users to view data in terms of absolute numbers or relative percentages, depending on their preference and analysis requirements.
- The reports will be expandable, meaning users can click on summarized numbers to access more detailed information. This will enable users to delve deeper into the data and gain a comprehensive understanding of the attendance status.
- The summary section of the reports will accurately reflect the current status of student, red, yellow and green. This will provide users with real-time information and enable them to track the progress and status of various activities or tasks.
- Alerts can have different level of severity depending on length of absenteeism and percent of absenteeism of students (2 to 3 level of alert depend on absenteeism time period).
- The aggregated reports shall have additional columns fetching data from other modules into the system. Only contextual data linking the displayed students is fetched for the specific report.

The additional fetched data from other modules includes:
- Student formative assessment data (current school year/ recent)
- Teacher's attendance data
- Teachers' performance from Class observation module (software not part of this TOR, only finalized data is loaded/accessed for reports)
- Teachers training data
- School environment/social/physical/behavioral selected indicators.
- GRM cases related to student/teacher/school
- The aggregated report will feature a mechanism to generate school or teacher level alerts. These alerts should be manually generated by the authorized user (Head teacher). The alert depending on its type shall be assigned to the respective stakeholder user defined in the flowchart. (e.g. If alert pertains to teacher training it'll be routed to PITE).

Other features
1. Data sensitivity being a primary concern. User log-in shall be double factor authenticated. Logins for the central web system and mobile application should be same. Double factor authentication should be built using email/WhatsApp & SMS (for worst case).
2. All reports should have a functionality to sort & filter on selected columns.
3. All alerts depending on severity levels and type should be color coded, everywhere in the system.

4. School calendar year to be defined into the system with all present and absent days. This should be updated based on ground reality.

3.5 Student Assessment Module:

This module is tightly linked with item bank module. It can be considered an extension built on item bank module. The items stored in item-bank are used here for assessments. Objectives of the student assessment module, such as assessing the learning outcomes model implementation Formative Assessment's performance of the students. Identified assessment methods and techniques that will be used to evaluate the students.

Stakeholders involved

- PMIU SELECT
- STEDA
- PITE
- DCAR
- DSE
- DEOs/TEOs
- HTs/Teachers
- Subject Coordinators
- Guide Teachers
- Master Trainers

Student Assessment Module (Formative/summative/diagnostic)
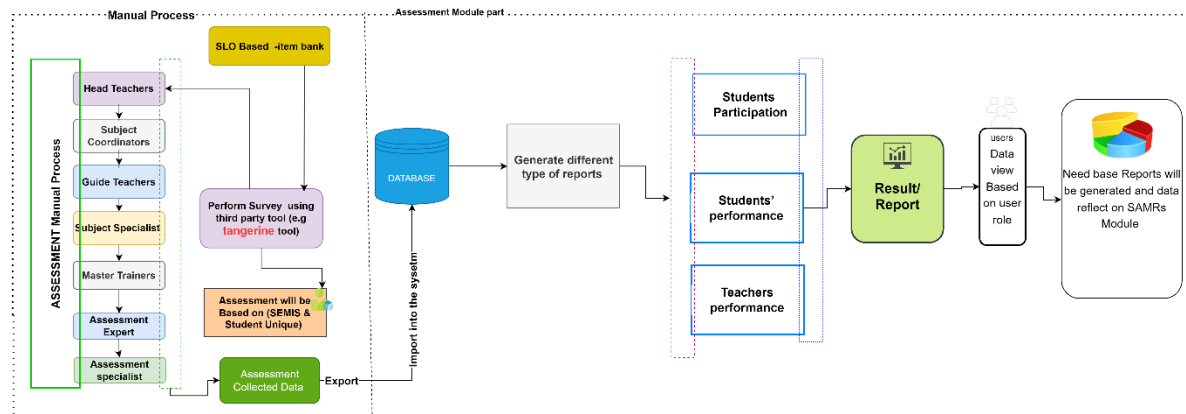
Figure 4 Student Assessment

- The Student Assessment Module will be accessible to Head Teachers (for reports), SCs (Subject Coordinators) & GTs (Grade Teachers) for paper generation/administration, MTs (Master Teachers), assessment experts, and an Assessment Specialist.
- The assessment module will include the Early Grade Reading Assessment (EGRA), which will be conducted using selected student IDs.
- EGRA will be part of the formative assessment process, taking place monthly at the end of each CPD (Continuing Professional Development) cycle at the school level. Each class will be assessed monthly; so tablets shall be pre-loaded with the assessment test & respective schools before the planned activity on regular basis.
- The (third party) **Tangerine** tool will be used for the formative assessment of EGRA, and the data collected will be imported into the assessment module. This data will help generate reports on multiple levels, such as students' performance, teachers' performance, students'

regularity, and teachers' efficiency and efficacy. These reports on the imported data are part of the system. These are approximately 8-10 comprehensive reports & related charts covering the key variables.

- In addition to student assessment data from the field, class room observation data against the teachers will also be available in the system against the teachers. The specified 3-4 reports shall also be added on that data alongside formative assessment report. The format of the report will be provided with requirements clarification stage, all base data shall be provided beforehand for developing the required reports.
- Specific reports will be highlighted for specific users in the hierarchy, including PMIU-SELECT, STEDA, PITE, DCAR, DSE, DEOs, TEOs, Master Trainers, Guide Teachers, Subject Coordinators, HTs, and Teachers. The reports should be easy to sort and filter based on selected columns & export functionality in (pdf, word, excel, csv).
- The data reports will be presented in both tabular and graphical formats, allowing for sorting and filtering functionality.
- The reports will be expandable by clicking on the respective summarized numbers, and the summary will reflect current active/closed/pending numbers.
- The respective assessment data will be highlighted in the student alert warning and Redressal module too.

The assessment module is linked with an item bank, which provides a pool of assessment items and generates assessment papers based on the provided and required objectives for conducting the assessments in the prescribed format.

3.6 School Learning Environment indicators:

This will be a small module accessible at school level to head teacher. School Environment & Infrastructure shall capture following indicators in a checklist supported with comments format at a school level on periodic basis:

- Adequacy of physical space, including classrooms, libraries, laboratories, and common areas.
- Availability of modern infrastructure, such as multimedia equipment, computers, and internet connectivity.
- Safety measures, including fire safety systems, emergency exits, and security protocols.
- Accessibility features for students with disabilities, such as ramps, elevators, and assistive technologies.
- Availability and condition of learning resources, including textbooks, e-books, and online databases.
- Adequate and well-maintained furniture, lighting, and ventilation in classrooms and study areas.

Socio-emotional Well-being:

- Availability of mental health support services, such as counseling, therapy, or access to external professionals.
- Implementation of social-emotional learning (SEL) programs that promote self-awareness, empathy, and emotional regulation.
- Opportunities for students to engage in extracurricular activities, clubs, and sports to foster social connections and personal development.
- Support for students' overall well-being, including addressing issues of bullying, peer pressure, and student conflicts.
- Training and support for teachers to create a positive classroom climate and establish supportive teacher-student relationships.

Community-based Factors:

- Collaboration with parents, guardians, and community stakeholders to ensure their involvement in school activities and decision-making processes.
- Partnerships with local businesses, organizations, and institutions to provide real-world learning experiences and opportunities for students.
- Integration of community resources into the curriculum, such as guest speakers, field trips, and service-learning projects.
- Recognition and celebration of cultural diversity and inclusivity through events, programs, and initiatives.
- Access to transportation services or arrangements to ensure equal educational opportunities for all students, especially those living in remote areas.
- Link with teacher attendance monitoring system HR.

Stakeholders involved

- PMIU SELECT
- DSE
- DEOs
- TEOs
- Cluster Head
- HTs/Teachers
- SMC

Flowchart School Learning Environment
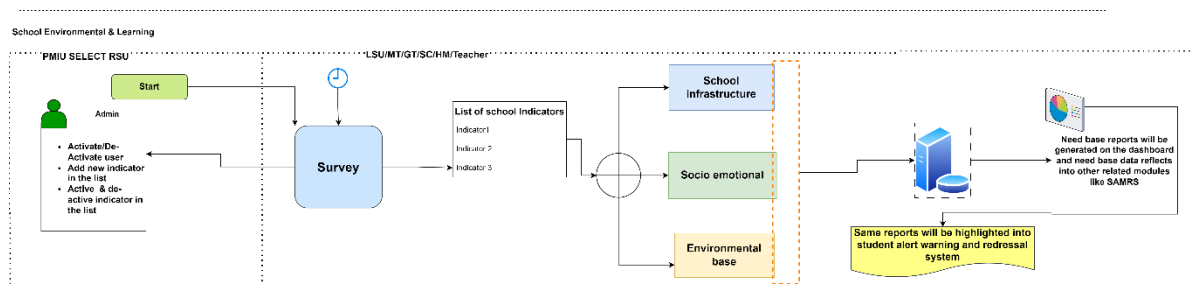
Figure 5 School Learning Environment

- The admin has the ability to activate or deactivate users, can (add/edit/delete) new category, indicators to the list, and enable or disable indicators at the user level.
- The periodic survey will be based on the school environment and learning, focusing on various indicators related to infrastructure, socio-emotional aspects, and the environment. All key indicators are defined above.

- The reports should be easy to sort and filter based on selected columns & export functionality in (pdf, word, excel, csv).
- The data reports will be presented in both tabular and graphical formats, allowing for sorting and filtering functionality
- The reports will be expandable by clicking on the respective summarized numbers, and the summary will reflect schools based on environmental, infrastructure & socio-economic factors.

- The data Reports generated here will also supplement the decisions made in "student alert warning & redressal module". These reports shall be integrated within the Student alert waring and redressal module too.

3.7 Teacher Training and Learning Resources Module:

The Teacher Training and Learning Resources Module is a platform designed to support the professional development of teachers and provide them with the necessary resources for effective teaching. This shall facilitate the working of PITE. In subsequent section is a brief overview of its key features and functionalities:

Stakeholders involved

- PMIU SELECT
- STEDA
- PITE
- DCAR
- DSE
- DEOs/TEOs
- Cluster Head
- Guide Teachers
- Subject Coordinators
- Master Trainers
- HTs/Teachers

Flowchart Teachers Training & Learning material
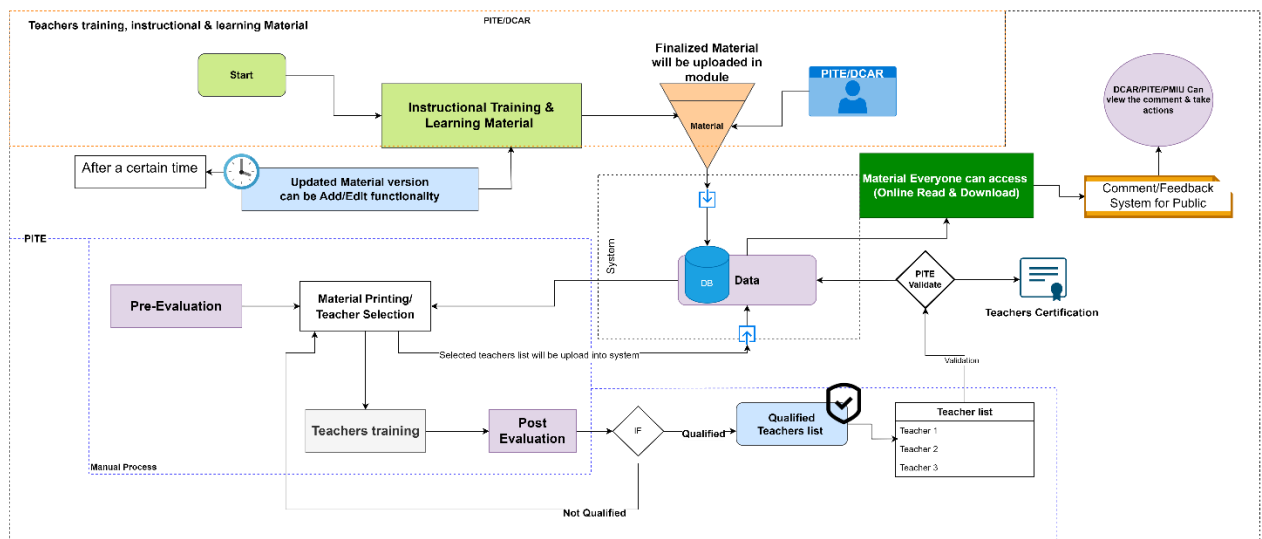
Figure 6 Teacher Training and Learning

- The finalized materials, including teacher training & learning documents, manuals, videos, will be uploaded into the system. The uploading of training manuals and learning materials will be done by PITE, while DCAR will be responsible for uploading student materials.

- Once the materials are uploaded, they will be publicly accessible to everyone. Users will have the option to download the materials and provide comments and feedback on them.

- The updated material should be under the control of the admin and editable. The admin will have the ability to add, edit, or disable the material as required.

- The training (to teachers) process will involve manually conducting a pre-evaluation, printing the required materials, and selecting teachers simultaneously. The system will allow for the uploading of selected teacher information (personal ID synced with HRMIS teacher's data) lists, including Master Trainers, Guide Teachers, Subject Coordinators, and regular teachers, by the respective users. Once the teachers are selected, the training process will commence.

- After the completion of the training, a post-evaluation will be conducted. If a teacher successfully qualifies the assessment, their test results will be validated and uploaded into the system.

- The trained teacher data will be validated by PITE. Once validated, the trained teachers will be provided with certification. All certification records against a teacher are to be kept into the system. The activity is time bound and timely updated by PITE users. The interface should support updating the single vs multiple teachers to a certification. The PITE user will also be able to see reports of teachers for different & collective certifications done. All certificates will have a unique ID. A soft copy of certificate with all details written shall be created on the system for each successful training. The softcopy will be downloadable by teacher.

- The admin user will have the authority to assign and define roles for users. They can also activate or deactivate users as needed, and have control over enabling or disabling specific functionalities for certain users.

3.8 Grievance Redress Module:
- Developed document, have to define flow of process and applications, role of users.
- Lodge and track grievances at the school level. (Level of process)
- Follow grievance protocols and timelines.
- PMIU SELECT system and helpline/call center.

Stakeholders involved

PMIU SELECT, Admin/HR, Focal Person GRM, District GRC

Flowchart Grievance Redress Mechanism
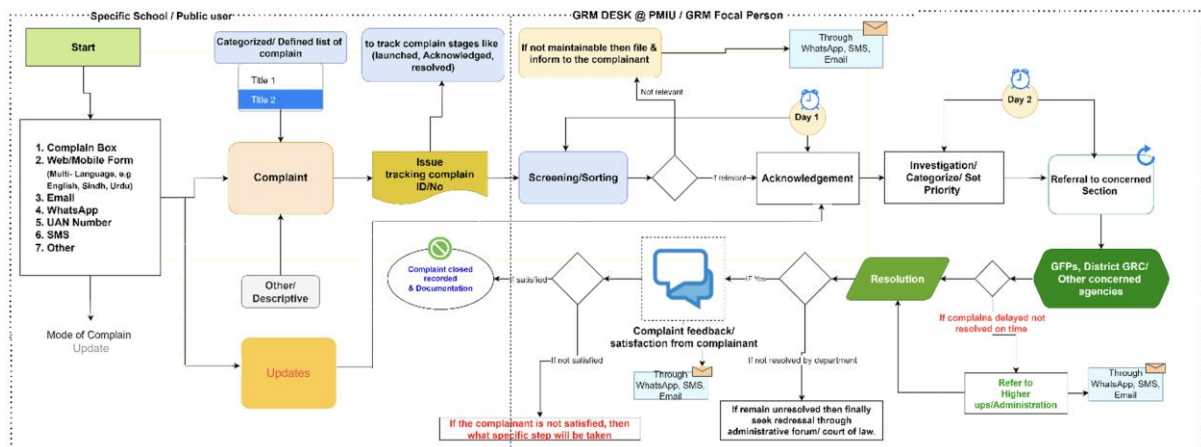
Figure 7 Grievance Redress Mechanism

The grievance system has two parts; one is complaints and other is updates.

3.8.1 Updates
Updates for the students/teacher's/parents' data shall be received into the system directly from public interfaces. The updates will be accepted after a review by the concerned school users & concerned stakeholders. Additionally, a system generated alert will be sent to initiating user to notify them of the update. The updated information will also be highlighted on the system for easy identification.

Updates received for students/teachers/parents may include:
1- B-form number where missing
2- Parents CNIC
3- Parents contact information (Cell1, Cell 2, email, address)

4- Teachers contact information (Cell1, Cell 2, email, address)

5- Any additional relevant information teacher may like to upload.

This information is useful to complete students' data & enable the program to remain in contact with parents & teachers for efficient schooling.

3.8.2 Complaints

Complainants can be initiated by (community/student/parent/teacher)

Mode of complain or update can be online form/WhatsApp/UAN no./Email/SMS/other

Complaints: Complaints can be submitted based on a predefined list of categories or through a descriptive option. The complaints are categorized automatically and then forwarded to the respective section or component for further action and resolution. This streamlines the process and ensures that complaints are directed to the appropriate channels for resolution.

- Grievances received via Complaint Box, walk in complain, Web Page, mobile App, WhatsApp, SMS, UAN etc.
- Complaints will be categorized and defined within the system. For complaints that are expected to be common and high in frequency, prescribed resolution procedures will be communicated to key stakeholders in advance, along with their roles in resolution and the time allocated to them before escalation. Additionally, there will be an "others" option for users to submit complaints that are not listed. In the end, complains will be analyzed, and any complaints that register continuously same and related that will be added to the defined list. Set timelines will be identified before a complaint is escalated to the supervisor/line manager of the grievances' focal person.
- Unique GRM ID is generated and assigned, that'll be issued & informed to each complainant. The ID will be used to track complaint. The complainant shall be notified for a) When complaint is launched with ID, b) resolved or c) if these is a status update. The grievance ID will be unique for the life of the program.
- All complaints to be received in PMIU system.
- Complain Matrix will be generated where timeline priority of complain, sensitivity and referral will be defined, system will auto refer/send respective user (GFPs, GRC)

- Screening/ Sorting (If maintainable or related it will move for investigation/categorization else not maintainable then file & inform to the complainant)
- Investigation/ Categorize/ Set Priority
    - Decide Appropriate Investigation at Assessment Stage
    - Decide Appropriate forum for referral
    - Assign risk level, priority level
- Referral to concerned section
    - Refer to GFPs (Grievance Focal Persons), District (Grievance Redressal Community)
    - Refer to other concerned agencies (Simultaneously other forums also work on same agenda)
- After resolution it will move for complainant's feedback & complain will be closed

Complaint Matrix

Following is the complaint matrix - with some predefined complaints – all predefined complaints and action items shall be provided to the firm at the requirements documentation stage. These are to be

incorporated into the GRM module meta data. Each complaint assigned users & number of resolution days are editable.

Sr No	Complaint	Resolution timeline	Referral to	Escalated to	Actions
1	Corporal punishment	2 weeks	HM/GFP	District GRC	**First time:** HM Give warning & upload apology statement into system & share with complainant. **Repeat offence:** Suspend teacher for X days. Notify HRMIS. **Repeat offence 2:** Escalated to District GRC. Proven guilty. Terminate teacher. Notify HRMIS. Update record. Replacement teacher request.
2	Teacher absenteeism	2 weeks	HM	District GRC	**First time:** Teacher warning and explanation letter & response uploaded, **Repeat offender:** Recommend Terminate. Notify HRMIS. Seek replacement.
3	Teacher lecture Quality inappropriate	4 weeks	SC / GFP	District GRC	**Fist time:** SC assessment & corrective action. Assessment uploaded into the system shared with complainant, If need training referred to PITE. **Multiple time:** Teacher referred to PITE & trainings administered,
4	No functional toilet	6 weeks	GFP	District GRC	**Once complaint:** Matter raised with head master & resolution is sought and shared with complainant. **Multiple complaints:** Issue is raised with District GRC for resolution. Resolution is recorded / notified to complainant.
..					
..					

Proposed Process of Grievance Redress Mechanism

Step 1
- **Grievance Acceptance**
  - All complaints to be received in PMIU System

Step 2
- **Acknowledgement, and Record**
  - The complainant to be notified about complaint reception, the compaint is registered in database and relevant management is informed. Unique ID is assigned to each complaint / Update

Step 3
- **Investigation**
  - Decide Appropriate Investigation at Assessment stage for cases not clearly defined
  - Decide Appropriate form for referral
  - Assign risk level, priority level

Step 4
- **Referal**
  - Referal to District GRC
  - Referral to other agencies

Step 5
- **Resolution**
  - Present resolution to management for review
  - Complainant informed about the Resolution

Step 6
- **Complaint Satisfication**
  - Yes: The process concluded with acknowledgement from the complaint
  - No: the (senior management) GRC is informed. if still inresolved, then necessary judicial/administrative forum could be approached.

Step 7
- All the steps for each complaint may be documented with timelines. Pictures of documents generated as part of resolution are pictured & uploaded into the system.
- Realtime reporting aligned with ISR to be accessible to

3.9   Item bank Module:

An item bank is a collection of test items or questions that are organized and stored electronically for the purpose of creating assessments or tests.

- PMIU SELECT
- DCAR/ PEACE
- Guide Teachers
- Subject Coordinators
- Master Trainers

System supported features of Item bank that shall be covered :

1. Item Repository
2. Item Metadata
3. Taxonomy and Item Classification
4. Item Authoring and Editing Tools
5. Version Control and Item History
6. Test Question design
7. Test piloting
8. Search and Retrieval Functions
9. Customize survey form
10. Pre-Define and customize Reporting and Analytics capabilities
11. Security and Access Control

Item Metadata: Each item in the item bank is associated with metadata that provides information about the item's characteristics. This metadata allows for efficient search, retrieval, and organization of items based on specific criteria, such as item type, subject area, or difficulty level.

Taxonomy and Item Classification: Item banks often utilize a taxonomy or classification system to categorize and organize items. A taxonomy helps in classifying items based on their content domains, sub-domains, or specific learning objectives (SLO's). This allows test developers to select items that align with the desired curriculum or learning outcomes.

Item Authoring and Editing Tools: Item banks shall provide authoring tools that allow test developers or subject matter experts to create, edit, and review items. These tools shall include features for formatting text, adding images or multimedia, and specifying item attributes such as item type (e.g., multiple choice, essay), scoring rules, and item difficulty. The type of items we shall be defining are specified in Annex – Item types.

Item Repository: The item repository is the central storage system that houses all the test items or questions. It is a database where items are stored along with their associated metadata, such as item ID, difficulty level, content area, and other relevant information.

Test piloting:

Test piloting, also known as pilot testing, refers to the process of administering a test or assessment on a small group of individuals before its full-scale implementation. The purpose of test piloting is to evaluate the test's feasibility, functionality, and effectiveness and to gather feedback to make improvements before its widespread use. Here are the key aspects of test piloting:

Customize survey form design

- Tool provides the appropriate question types that align with the information that want to collect. Common question types include multiple-choice, rating scales, open-ended questions, Likert scales, and demographic questions.

Search and Retrieval Functions:
- Item bank shall offer search and retrieval functions to enable users to locate specific items based on various criteria. These criteria may include keywords, item type, difficulty level, content area, or other item attributes. This functionality helps test developers in assembling test forms or assessments based on their specific requirements.

Version Control and Item History:
- Item bank shall include version control features to track revisions and maintain a history of item changes. This allows users to view the evolution of items, track modifications, and ensure the integrity of the item bank content.

Security and Access Controls:
- Given the sensitive nature of test items, item banks incorporate security measures to protect the integrity and confidentiality of the items. Access controls, user permissions, and encryption techniques shall be placed to restrict unauthorized access and ensure that only authorized users can view, create, or modify items.

Pre-Define and customize Reporting and Analytics Capabilities: -
- Item bank module shall provide basic reports as well as future for customized reporting generation and analytics features to track item usage, item performance, and other relevant statistics. Each item response correctness over different timeframe & geographic aggregations or both should be provided; in graphical form as well as textual form.
- This information helps test developers assess the quality of items, identify gaps in content coverage, and refine assessments over time.

Key users of Item Bank
From item creation and review to item deployment and analysis. Here is a general overview of the Users:

Assessment Expert:
- Give design of paper according to table of specification.
- Review received items from Item reviewer (IR) according to Assessment Framework.
- Super check and send back rejected items with comments and reason for rejection to Item Reviewer.
- Accept items for further processing.

Item Reviewer:
- Assign tasks to item writers with respect to grade, subject, content strand etc.
- Review received items from Item Writer (IW) according to parameters of item development (grade, subject, SLO, cognitive domain etc.).
- Send back rejected items with comments and reason for rejection to IW.

Language Translator:
- Review items from language point of view and send back to IR.
- May send/receive items to/from ITEM Reviewer or Assessment Experts for review

Item Writer
- Create, delete, update, save, submit, etc.
- Maintain log.
- Unable to modify after submitting items until not allowed (by subject specialists).
- Able to receive feedback/comments from upper hierarchy.
- Add items as per set criterion of Curriculum and Cognitive domain.

School Teacher / GTs, SCs
will be able to generate test forms, quizzes according to set criteria/table of specification described

- HTs/Teachers
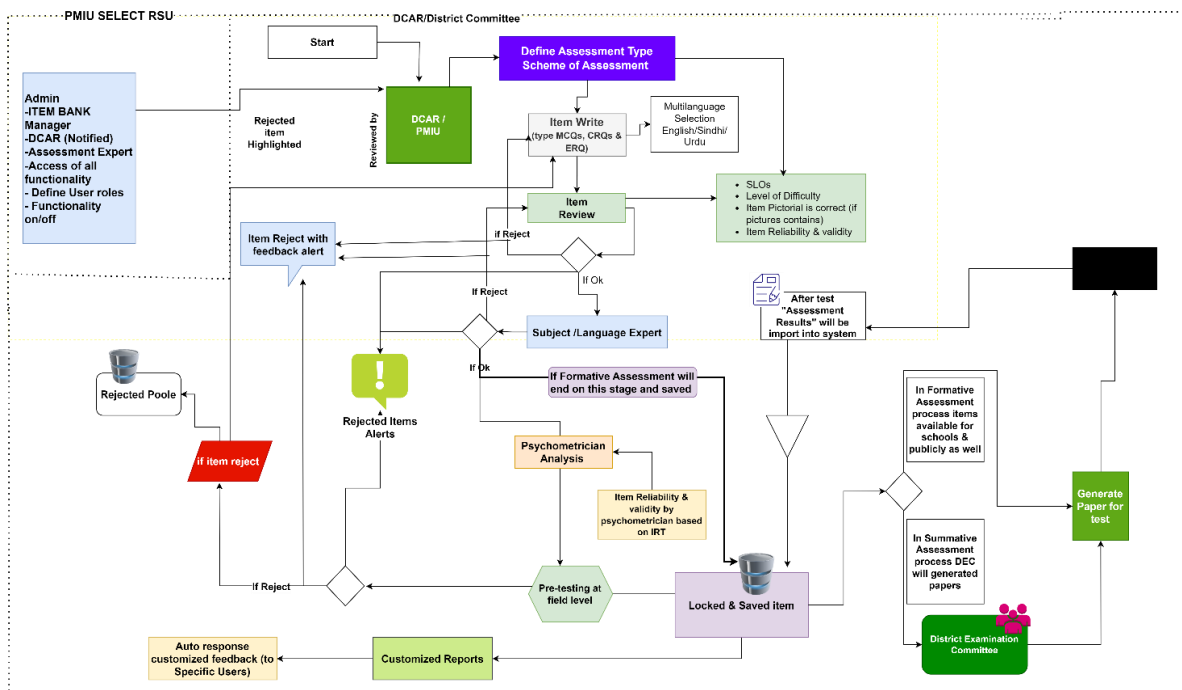
Flowchart item bank module

Figure 8 item bank

ITEM Bank Application Flow/STEPS

- Scheme of Assessment has defined Level of Difficulty, correct stimulus (if pictures contains) relevancy with item and selection of assessment type i.e. (Formative, Summative or Diagnostic Assessment).
- Item will be defined that could be Task, MCQs, CRQs, ERQs,
- TASK, MCQs, CRQs, ERQs options admin can ON/OFF mode in the system, defined lay outs shall be available as per the type of item such as MCQs, CRQs & ERQ. The layouts shall be incorporated into the system (to be provided at the time of prototyping) by formative assessment expert.
- After the item is defined that will be drafted by an item writer in language workshop/remotely, it could be in different languages (English, Sindh, Urdu), English could be ON/OFF Mode, item writer will also check level of difficulty item. SLOs (student learning outcomes) aligned with the syllabus for all grades and all subjects, Sequence of ITEM, Item Difficultly level, required cognitive level are attributes added to the system.
- Item reviewer will check the item according to SLOs and competence.
  1. If item is rejected, reviewer will insert its feedback alerts and return it to the concerned item writer.
  2. Else it will move to next step that is Subject Specialist and language expert review.
- Subject Specialist and language expert will check subject relevance of the item.
  1. If item is rejected at this stage, Specialist and language expert will put feedback and back and return it to item reviewer.

2. Else if system check if item type is formative assessment, it will be saved & locked & will be used for combined paper as well as single item generation, the formative assessment items access is available for schools as well as publicly.
3. Else item type other it will move to next step for Psychometrician Analysis (including Pre- testing of item on a small group)

- In case of "Formative Assessment" the papers are ready to be generated at this stage. The access will be made available to online guest users as well as Guide teachers & subject teachers in the field to generate respective papers.

- In Psychometrician Analysis checked item reliability and validity base on IRT. Based on Psychometric analysis Item will be Stored in Item Bank to be used or placed in the rejected items.
- After that the Item pre-testing at field level if item is Okay it will saved & locked in Item bank, if item rejected, it will be sent to rejected pool.
- Item finalized & saved into item bank:
- The system check if item type is summative assessment, the district examination committee will generate combine paper as well as single item for test based on their needs.
- In each District paper will be same generated & used for test.
- After the test/exam the results will be import into item bank system, based on that result custom reports will be generated and auto response customized feedback sent to concerned users.
- The admin user will have the authority to assign and define roles for users. They can also activate or deactivate users as needed, and have control over enabling or disabling specific functionalities for certain users.
- Time scheduling setup should be in system on every step, Admin can set time period on every step while users generating item.
- Paper layouts should be system selected and auto generated based on user requirement.
- Complete Item history should be maintained with date/time, student ID answered, school, and answer.
- Rejected/deprecated items alerts/notifications will be generated at each stage for item writer, reviewer subject expert.
- Post assessment of item: item will be update/modify based on assessed reports. In case of modification, new item shall be created and old should be disabled. Disabled items will keep history and related data intact.

-

Diagnostic Assessment
- Need base assessment. It is a group assessment with questions for both students & teachers.
- In case of each diagnostic assessment an Item list will be defined into the system. It will be a group of items. Items are same as defined above.
- Additional List of questions are also defined for children (background questions) and subject teachers (assessing teachers' inputs), based on these questions, the paper generation and test assembling will be done.
- These three set of questions are asked from each batch being assessed. The batch comprises of subject teachers as well as students answering the questions. The track of each batch shall be kept in the system.
- After test, results will be uploaded into system and answer reports/results shall be generated, summarizing the results.

3.10 M&E Module

The M&E Specialist, assisted by the M&E Officer, will prepare bi-annual reports in accordance with the Project's Results Framework. These reports will be compiled using implementation reports generated from different systems encompassing SELECT Project Components (1, 2, and 3), various implementing units, and allied agencies of SE&LD. These agencies include Sindh Teacher Education Development Authority (STEDA), Provincial Institute of Teacher Education (PITE), Teacher Training Institutes (TTIs), DSE (Director School Education), DGM&E (Directorate General Monitoring and Evaluation), DCAR (Directorate of Curriculum, Assessment, and Research), Design and Supervision (D&S) firms, and Technical Assistance (TA) firms. The purpose of these reports is to monitor the Project's Performance-Based Conditions (PBCs) and track activities, including the number of activities and intermediate beneficiaries.

Additionally, monitoring against the data generated by different modules in the systems for different processes will be carried out by the M&E staff. To support this monitoring activity sample-based data shall be generated by the system by selecting geographic details, duration to be monitored, process name and size of sample. The generated sample data shall facilitate targeted field monitoring against the factual instances, The data is exportable in CSV formats. Complete log of each data generation / export is maintained for accountability perspective.

M&E PMIU Module Flowchart
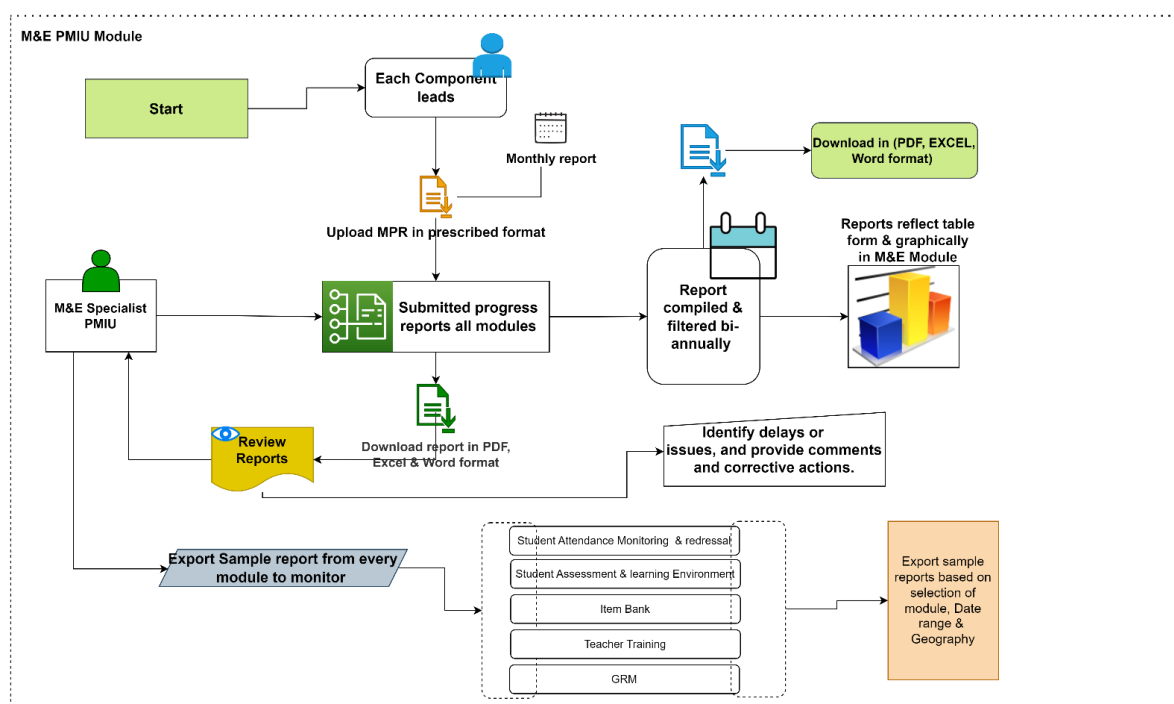
Figure 9 M&E

M&E Reporting and Progress Tracking Workflow for SELECT Project

1. Start: M&E Specialist prepares bi-annual reports by gathering implementation reports from SELECT Project Components, implementing units, and allied agencies.
2. M&E Specialist compiles reports and tracks activities, number of activities, and intermediate beneficiaries.
3. Component Leads upload monthly narrative progress reports using the provided template. *(M&E Specialist has already shared the template with SELECT Project Components Leads)*.
4. Uploaded monthly progress reports of the components are available for reviewing and downloading in PDF, MS Word, and Excel formats as the Database produces original reports and also generates consolidated reports in PDF, MS Word, and Excel formats.

5. M&E Specialist reviews and downloads original and consolidated reports monthly.
6. M&E Specialist consolidates reports and prepares a monthly progress summary.
7. Submit the monthly progress summary to the Chief Program Manager and Project Coordinator.
8. Utilize the reports to track progress, identify delays or issues, and provide corrective actions.
9. Obtain monthly reports from the database for bi-annual report compilation.
10. Compile and consolidate the bi-annual reports.
11. Submit bi-annual reports in February and August.
12. Bi-annual reports provide a comprehensive narrative of project progress and achievements.
13. M&E Specialist uploads Bi-annual Implementation Progress Reports to the database for access by SELECT management and the World Bank.

4   Technical considerations

4.1   Webservices for the data management/sharing

The system will have web services for sharing/updating information of any registered student as well as associated stakeholders including teachers/schools. The webservices will have following features covered:

1. Webservices to query enrolled student status using
   - B-Form number
   - Father/Guardian CNIC
   - Student unique ID
2. Webservice to update current enrollment of student
   - Using Unique Student ID
   - Using B-Form
3. Webservice to enroll a new student into a SEMIS school & generate related ID.
4. Webservices to Update B-Form against Student ID
5. Webservices to add/update/inactivate teachers' data with related parameters. These may include providing integration support to other department (HRMIS) from where teachers data is being supplied, housed & regularly updated.
6. Webservices to retrieve/update trainings data of teachers
7. Webservices to add/update/inactivate schools' data with related parameters.
8. Webservices to add/retrieve items in item bank
9. Webservices to send off attendance data (full/sample) to DG (M&E) to conduct sample-based attendance monitoring.
10. All webservices are to be used with user/password, which can be defined in admin section.
11. All software implementation internally for different modules should be using web-services to receive & update data.
12. All webservices activity to have a logging feature for the selected users. Logging has to be done in the database tables.

4.2   Existing code base

Existing software systems are available with RSU, developed for field implementation and are already mature, these can be used for 1) understanding the functionality required e.g. reports formats 2) Integrating the stable functionality already deployed and mature into the newly developed systems. This include both android application and web system.

Specifically – the module to collect teachers' biometric attendance in the field is mature. That entire module has to be collated into the field application. So there is consistency. Any (already developed)

additional modules identified at the requirements /specifications, both for Web / mobile system shall be integrated into the system.

These source codes shall be discussed and shared with implementation firm at the time of requirements finalization / prototyping.

Field shall have only one custom application & one web-system – running all the modules mentioned in this document, unless agreed explicitly otherwise.

4.3   Tablet in the field

The school assigned tablets in the field shall be pre-registered with the system & synced. Since all the enrollment of students involve assigning a unique student ID which has to be consistent between central system as well as the field tablets. There will only one tablet functioning per school for student enrollment role. It has to keep track of assigned student ID vs new student IDs to be handed out at the time of enrollment.

In case a tablet malfunctions or is broken; a new tablet has to be synced / registered with central server for the specific school, to start enrolling students. Now, even if the old tablet is repaired it won't enroll the students unless the other tablet is disassociated and old tablet is re-registered.

5   Dashboard & information management

It provides users with a consolidated and visually appealing overview of critical information, facilitating data-driven decision-making and improving overall performance.

A comprehensive dashboard is to be developed for the system consolidating all the reports / charts for all the modules in the system, aggregating almost all key columns, as identified by respective functional resources.

The reports should be drillable and sortable on any columns. Export friendly. Applying filters capability should be extended in the reports. Filters on Time, geography and modules key attributes shall be allowed for all reports.

Charts should be interactive and dynamic. The available data columns should be selectable to display in the chart. All hierarchies defined in the system (section 2.2) shall be selectable/drillable while reviewing any/all reports. Multiple time period selection should also be possible in a chart to review changing characteristics over time. Especially true of student assessment modules & type of complaints received – solved.

The system must enable downloading of data in Excel and downloading of visuals in graphical and picture format (JPG, PNG etc.) for dissemination and sharing. The system will provide tools for basic data analysis such as producing summary statistics, simple graphs, trend plots, etc.

Pre-defined Executive Dashboard Reports (in consultation with PMIU SELECT and DGM&E) to prepare the SAMRS (student attendance management & redressal system) report, providing an

overview of KPIs. A provision of 30 comprehensive reports and associated charts should be considered for the entire system.

The system will have two categories of reports standard reports and ad hoc reports. Standard reports will be designed and uploaded during implementation, while ad hoc reports will be generated using a customized Query Builder feature. Data, along with indicators or selected columns, can be downloaded as MS Excel Sheets or CSV files.

If the vendor proposes any third-party tools for specific add-in software package required for data analysis and processing, they must provide full justifications and cost details in the proposal.

The system will have the provision for tablet/ mobile phone/computer-based, on-line data entry/access, as well as off-line data entry/access where data can initially be entered/saved locally and uploaded to the central database directly from the local files.

The access to the system and the modifications made to the database must be automatically registered in the system and a record is kept of the users which made the modification, the date and the place it was made.

The system will provide options of downloading the data (to authorized persons only) from schools in different formats such as CSV, MS Excel etc through a UI – with complete activity log.

The software shall keep the track of user login / sign out and activities performed on database each time and keep specific logs or history data sets.

5.1 Software installation
I.   Develop application installation guidelines for newly procured tablets and train the concerned teams. The application shall be available on google store.
II. All applications & Dashboard set-up and pilot testing at School, Taluka, District, Regional, and Provincial level for two three months cycle post development is mandatory before finalization of systems.
III. Stakeholder workshop, after the test cycles, to be organized and feedback to be included in the final draft.

5.2 User Training
I.   Identify Master Trainers Minimum two in each District nominated by DSE (24) and two Monitoring Assistants in each district from M&E Team (24) and 12 LSU members in 12 SELECT Districts (12) = Total 60 MTs to be trained
II. Development of manual and video tutorials in English, Urdu and Sindhi
III. Development of detailed manuals and training materials on the use of the SAMRS application and dashboards targeted at primarily executioners, monitors, administrative staff and the provincial management and decision makers, which include but are not limited to: HMs, TEOs, DEOs, Directors, SEMIS Managers, DGM&E (Director, Deputy Directors, Chief Monitoring Officers, Monitoring Assistants).
IV. Development of a detailed maintenance manual for the MIS.
V.   Schedule training sessions on the use of the dashboard (data entry, report generation, dashboard filters) in liaison with DSE for all potential users.
VI. The firm will also be expected to conduct Training of Trainers (ToTs) for the concerned institution / relevant department where the system will be housed.

VII. Conduct class-room style training with effective facilitators who are able to communicate in Sindhi and Urdu.
VIII. Carry out post training & post test phase evaluation and share report.

5.3 Interfaces extended through the system to users / public

Following interfaces of system shall be enabled for all communication with users interacting with the system.

1. Web Page – accessible everywhere including to anonymous / guest users
2. Mobile App – accessible to system stakeholders / users only
3. WhatsApp – accessible to public for complaints / grievances & information notifications
4. Program email integrated with the system.
5. Automated SMS through integrated gateway – with PTA registered short code.

5.4 Corrective and adaptive regular maintenance reports

The firm will be responsible for system troubleshooting and updates to the system in the 12 months following system deployment.

Corrective Maintenance Reports:

- Identify and document issues, errors, or bugs in the system or software.
- Describe the specific problem or malfunction encountered during regular maintenance activities.
- Include relevant details such as the date, time, and location of the issue.
- Provide a clear and concise description of the problem, including any error messages or symptoms observed.
- Document steps taken to reproduce the issue, including any inputs or conditions necessary for the problem to occur.
- Capture information about the impact of the issue on system functionality or user experience.
- Include any temporary fixes or workarounds implemented to address the problem.
- Outline the actions taken to investigate and resolve the issue, including the involvement of development or technical teams.
- Document any changes made to the system to fix the problem, including code modifications, configuration adjustments, or updates to dependencies.
- Provide information on the final resolution and whether the issue has been fully resolved or requires further monitoring.

Adaptive Maintenance Reports:

This report is to be prepared specifically after the conclusion of field test cycle to be done after head office UAT of all the modules in the systems.

- Document modifications or enhancements made to the system to adapt to changing requirements or business needs.
- Describe the specific requirement or change that prompted the adaptive maintenance activity.
- Include details on the rationale behind the requested change and its expected impact on system functionality or performance.
- Outline the steps taken to analyze and assess the feasibility of the requested change.
- Document any design or architectural modifications made to accommodate the change.

- Capture any updates to system documentation or user guides resulting from the adaptive maintenance activity.
- Provide information on any testing or quality assurance activities conducted to ensure the effectiveness and compatibility of the adaptive changes.
- Include details on the implementation of the adaptive changes, such as code updates, configuration adjustments, or data migrations.
- Describe any training or communication efforts undertaken to ensure stakeholders are aware of and prepared for the adaptive changes.
- Document the final outcome and validation of the adaptive maintenance, including user feedback or performance metrics.
- By maintaining separate reports for corrective and adaptive regular maintenance activities, organizations can effectively track and document the issues encountered, resolutions implemented, and adaptations made to ensure the continued performance and relevance of the system or software.

5.5   Platform and Technology:

i.   The proposed system will utilize the MariaDB version 10.6.x database server for data storage. Data will be stored in the MariaDB database server after undergoing necessary validation.

ii.   The system will be web-based, with mobile-based interfaces to capture, review, and edit field-collected data in real-time and offline mode. Data will be automatically synced when a network connection is available.

iii.   The mobile application will be developed for the Android platform using programming languages such as React-Native, Kotlin, and Swift. Provisioning for an iOS application will be considered as an additional feature.

iv.   The choice of front-end programming languages, back-end platforms and database will include options such as PHP/Laravel, Node.js, Vue.js, JavaScript, and MariaDB/MySQL. The inputs and outputs generated by the system must strictly adhere to the requirements outlined in the SRS document and prototype.

v.   The system will make use of popular front-end UI frameworks such as Twitter Bootstrap, Foundation, Google Material Design, Material-UI, Semantic UI, etc.

vi.   Any open-source comprehensive BI Reporting system shall be deployed.

Any suggestions by the incoming firm are welcome – open to discussion.

5.6   Security Features:

The software must adhere to ISO27001 data security standards. The following requirements should also be strictly complied with by the firm:

i.   The system will enforce two-factor authentication login procedures, utilizing methods such as email or text verification.

ii.   Access to the database and system functionality will be based on user roles within the organization.

iii.   The proposed system will include a comprehensive audit trail that captures login activities, edits, views, timestamps, and user trails.

iv.   SSL certificates will be installed to secure all web links and server emails.

Concurrency, Browser Compatibility, and Bandwidth Optimization: Considering low network bandwidth, the developed software must perform optimally with a page load time of less than 30 seconds on a PC connected to a network with a minimum bandwidth of 56 kbps. The system, including the database, should support concurrent access from multiple users simultaneously.

The system compatibility

The system should be compatible with latest and widely available browsers and systems. Any limitations to the browsers or environments which arise later on would be resolved by vendor without cost. Following should be specifically checked

A	Microsoft Internet Explorer 11 and above
B	Mozilla Firefox 50.0 and above
C	Google Chrome 55.0 and above
D	Safari.

The system must run on any screen sizes(responsive).

5.7   The development methodology:

The system has multiple modules & integrations. Lot of work will be done in parallel, but for each module the hired team shall follow the same methodology defined below. The System architect will need to keep all the modules aligned to the bigger integrated picture.

Broadly; for development phase all the systems (which are dependent on data from other depts) shall be developed first on static data and once the features implementation and UAT is complete – it should be integrated with dynamic data from other departments using webservices. Hence each module implementation is broadly in two steps.

i. **Requirement Study and Documentation:** The Firm will conduct a thorough requirement study, on the proposed process flows, closely examining the given flow and understanding the project's/modules needs. Based on this study, the vendor will develop essential documents such as the Software Requirement Specification (SRS) document, Software Design document, and associated workflows. These documents will serve as a blueprint for the development process.

ii. **Prototype Development:** Once the SRS, workflows, and design documents are accepted by the client or procuring agency, the vendor will proceed to develop a non-functional prototype of the system. This prototype will be created for both the web application and mobile application. By presenting the prototype to the client, the firm aims to gather feedback and ensure that the system's design and functionality meet the expectations of the users. The prototype will help in achieving better user acceptance and usability.

iii. **Testing and Issue Resolution:** After the development phase, the software will undergo testing at the vendor's premises. It'll go through the certified QA's for first test cycle. The vendor's dedicated testers will thoroughly test the software and identify any functionality bugs or issues. The vendor will promptly address and fix the reported bugs to ensure the software's stability and reliability. The complete test case logs will be provided as part of the project deliverables.

iv. **User Acceptance Testing:** Once the vendor has internally approved the software, it will be tested for user acceptance. PMIU SELECT RSU and identified users will participate in the testing process. They will evaluate the software's performance and provide feedback on its usability, functionality, and overall suitability for their needs. This phase allows for further refinement and improvement of the system based on user input.

v. **Final Testing and Deployment:** Following the successful completion of user acceptance testing, the final testing phase will be conducted. This phase involves comprehensive testing of the software package, including the data, at the premises of the RSU and other stakeholders. The system will run through identified pilot schools & run through a complete field functionality test cycle, The software will be thoroughly evaluated to ensure its stability, performance, and adherence to requirements. Once the testing is completed, necessary adjustments are made, the software will be deployed for live operation at the RSU. The necessary base data will be configured to enable its functionality.

vi. **Bug Fixing and Maintenance:** During the live operation, if any bugs or minor adjustments are identified, the vendor will promptly address and fix them. Bugs will be categorized as Critical or Non-Critical based on their impact on the system's functioning. Critical bugs that significantly affect the procuring agency or other agencies' operations will receive immediate attention and resolution within 24 hours of receiving the complaint. Non-critical bugs will be fixed within two weeks.

5.8 Network connectivity requirement

The proposed system shall be deployed over the provided hosting by the client & accessible through WAN in the field and to the involved stakeholders. The stakeholders should connect and communicate using mobile and/or web-based interfaces.

The client will be responsible for setting up of the Server and Database Server and providing connectivity to vendor for (UAT) test (after internal testing by the firm) & training deployment of the system. However, uploading of the system to live, maintenance of the server once the application is finalized will be done by the client; however, maintenance of system shall be done by vendor under the Warranty Support and maintenance contract thereafter on training/test environment.

5.9 Data Security and Integrity

1. The software shall keep the track of user login / sign out and activities performed on database each time and keep specific logs or history data sets.
2. Each table in database
   a. All insert & update time stamp with performing user ID is maintained
   b. All record deletions are stored in a log.
3. Any modification (insert, delete, and update) for the database shall be through the system.
4. Provide proper data backup, and disaster recovery mechanism.

5.10 Service Level Agreement

- One-year warranty and one-year post warranty annual maintenance contract (AMC).
- The selected consultant/firm/company shall have to work together with RSU-PMIU SELECT during development to implementation period.
- The SRS, Operations Manual, Training materials, documents and source code would be handed over to the PMIU SELECT RSU.
- The system should be able to keep historical information of entire data and changes by each user.
- The firm will provide back end and front-end technical support during the project duration.

- The firm will provide troubleshooting services in all entitled districts of the project, during the project duration. This is done through the central interface of PMIU SELECT technical team.

5.11 Conformity with Standards

The to-be developed system should strictly adhere to the following standards:
1. Data security to ISO27001 standards.
2. Source code should be peer-reviewed and well commented. A standardized approach shall be followed.
3. Quality assurance of the software should be done in a standardized way. Complete test cases list should be prepared against the system specifications.
4. Training material should be complete & self-sufficient; and new users should be able to use that without external instructions (if needed).

5.12 Checklist of Project Deliverables

Following is expected for each software module & component built/deployed for this project.

1. Software Requirement Specification Document (High level SRS and Low-level SRS)
2. Software Design Document (SDD)
3. Non-functional/Static HTML Prototype
4. Working and Tested Software with source code
5. User and Administrator Manuals for the system including Online Help
6. Setup and Release notes for each new release
7. Test Cases and validation/fixation Reports
8. All database scripts
9. Training of trainers material
10. Any other relevant documents, supporting software/licenses, etc.

5.13 Use of Source Code Management Tools

The vendor must manage its source codes through a source code management tools like Subversion (SVN) and GIT or any other source code management tools, so that programmers can work in parallel without duplication of work. It will also be a useful tool to track previous versions of the codes and will be useful for debugging purpose.

All source code should be accessible to the SELECT project technical team & all versions should be visible to the team specifically after initial UAT, production deployment and all subsequent iterations in support phase.

The code should be checked in on PMIU provided hosting; post production deployment.

5.14 Ownership of Source Code and other Intellectual Property

The PMIU SELECT will be the rightful owners of the Source Code and all Intellectual Property associated with the system and they will have full rights over the ways they can use these resources. The management system so developed will be the sole property of the PMIU

SELECT or any agencies designated by them. The Software Development Vendor (SDV) will have no right to commercially use or apply the software elsewhere.

Any licensed software component deployed (ex for reporting etc.) for the project shall also be handed over to the PMIU technical team before support period starts.

5.15 CMMI certified company

The vendor must at least be a CMMI level 2 company with a valid active license for at least three consecutive years.

5.16 Naming Convention/standard

In order to keep source codes organized, vendor must strictly follow standards for forms, reports, database, triggers, views, stored procedures, coding etc. The standard should be mentioned as part of the proposal and should comply to a third-party standard.

5.17 Two factor authentication – login

All login in the system should be linked as two-factor authentication. Two factor may use email-ID or Phone number or authenticator app on phone.

All users of the system should have an email ID & phone number preferably WhatsApp linked.

The order of authentication
- Email ID shall be used as a primary authentication mechanism.
- WhatsApp is Secondary authentication mechanism.
- SMS is third authentication mechanism.
- On call (to system Admin)

Note: Purchasing and processing of a short code from PTA to be used by the department for official messaging is required.

5.18 Timeframe of the Assignment

The contract is expected to begin in 01st September 2023 and will run until 18 months of contract signing. However, depending on operational requirements these dates may be revised.
1. Tentative Schedule of Delivery

S.No.	Deliverables	Timeline/Deadline
1.	**Signing Contract**	As per given time in bidding document (T)
2.	Inception Report (including work schedule) submission	T + 1 Weeks from the signing of the contract
3.	**Initial documentation deliverable:** a) Software Requirement Specification Document b) Data flow and detailed technical requirement document c) Software Design Document (SDD) Iterations on changes	**T + 7 Weeks** T + 2 Weeks T + 5 Weeks T + 7 Weeks Ongoing
4.	**System visuals deliverable:**	T + 7 Weeks

	a. Non-functional HTML Prototype for Web b. Prototype for Mobile Application	

5.	Deliver (Module) complete developed Student Attendance Monitoring module
	Including
	   - User guide/training manual
	   - User training/orientation
		T + 8 Weeks
		
		T + 9 Weeks

	PMIU Feedback accommodated/ Revision on above	T+11 Weeks
	Module wise delivery: Modules delivery priority to be set on inception. Application testing. Test Cases and validation/fixation Reports User training (including manual preparation in English, Urdu, and Sindhi). Application and dashboards go live	T+15 Weeks T+16 Weeks .. T+20 Weeks .. T+22 Weeks
	Handover of Administrative control of all MIS modules, design, training of staff and technical documentation (system deployment report), source code and database to PMIU SELECT.	T+26 Weeks
	Training material deliverable: **a.** User and Administrator Manuals for the system including Online Help (Video tutorial) **b.** Training of trainer's material	T+30 Weeks T+32 Weeks T+32 Weeks

	System material deliverable:
	
	   1. Complete database scripts
	   2. Commented & peer reviewed source code
	   3. Bug fixing status report
	   4. Any other relevant documents, supporting software/licenses, etc.
	   5. Setup and Release notes with each new release
	
	MIS/technical team handover acknowledgement.
		T+32 Weeks

	12 Corrective and adaptive maintenance reports & system Updates – after field test cycle complete.	T+42 Weeks

	System material deliverable:
	
	   1. Updated database scripts
	   2. Updated source code [Online check-in]
	   3. Updated relevant documents, supporting software/licenses, etc.
	   4. Updated Setup and Release notes with each new release
	
	MIS/technical team handover acknowledgement.
		T+48 Weeks
		
		Iterative till support period ends.

The submission of milestones will be considered as an incomplete document and shall not be considered as approved until the 100% ratification of queries raised by PMIU SELECT RSU and SELD.

5.19 Qualification and team composition

- The firm should be CMMI Level 2 certified for at least 3 years.
- The firm should have experience in designing ISO 27001 compliant applications. Client certificate required.
- The firm must have at least 5 years overall experience in designing IT platforms (such as dashboards or MIS systems) of similar scale, and integration with other dashboards
- The firm must have experience of successful design, develop, commissioning and support of electronic based On-line Data Collection and processing related Software in the last five years.
- The Firm must have successfully designed, developed, installed and commissioned such web based & mobile app management information system software for a government organization, for any college or government departments or government corporation or public limited organization.
- Preferred: experience of designing and implementing attendance monitoring systems in the public sector.
- The firm should provide details (documentary evidence e.g. contract award or reference letter from the clients stating scope of services) of all such projects for the last 5 years or more during which they were complete
- The firm shall ensure the availability of key staff (including Project manager, Business Analysts & Architect) to the Client in the same city post signing of contract to ensure that services are rendered to the Client without any delay or disruption.
- Travel will be required for consultations with Directorates of School Education and for piloting of implemented modules in field.
- Ensure the resource deployed stays throughout the engagement – so there is continuity.
- Ensure team proposed in the proposal is consistent to the team that'll deliver the work.
- Arrange full module wise team meeting (online/offline) as/when client demand – specifically on each milestone of each module starting with requirements finalization to signoff.

The (minimum) team of experts shall be as below for delivery & support period:

Position	Type of Position	Delivery period		Support period	
		No of positions	Delivery. Expert Person month (Months)	No of positions	Expert person month
Team lead / Project Manager	Key Expert	1	6 months	1	12
Business/System Analyst	Key Expert	2	3 months		
Senior /Software Engineer	Key Expert	2+4	4 Months	1+1	12
User Interface Design Expert + Documentation expert	Key expert	1	2 + 4 months	1	3
Quality Assurance Engineer	Key expert	2	3 Month	1	3
System Architect	Key Expert	1	6 months		

Qualifications are below:

Position	Type of Position	No.	Total Man Months	Qualification	Experience
Team lead / Project Manager	Key Expert	1	18	At least, Master's/Bachelor's degree (16 years of education) in Computer Science / Computer Engineering/ MIS/ Systems Engineering/ System Design or relevant discipline	At least 08 years of experience as Software Project manager. Overall 8 years of Software related experience **Certified: PMP Certified.** *Skills: Project Management; System Analyst; Business Process Engineer; Deep Software & databases understanding, lead and manage project teams,* *Abilities:* Result oriented, motivated & meet deadlines.
Business/ System Analyst	Key Expert	2	3	At least, Master's/Bachelor's degree (16 years of education) in Computer Science / Computer Engineering/ MIS/ Systems Engineering/ System Design or relevant discipline	At least 05 years of experience as Software Project manager. Overall 8 years of Software related experience PMP Certified. *Skills: Project Management; System Analyst; Business Process Engineer; Deep Software & databases understanding, lead and manage project teams,* *Abilities:*

					Result oriented, motivated & meet deadlines.
Senior /Software Engineer	Key Expert	2+4	16	Master's/Bachelor's degree (sixteen (16) years of education) in computer science, from a foreign or local university duly recognized by the Higher Education Commission (HEC) of Pakistan.	***Qualification and Knowledge and Experience:*** At least 08/04 years of experience as Software Engineer. ***Skills:*** *PHP/Laravel; JavaScript; NodeJs; MongoDB/SQL; Android(Java/React native/Kotlin/Swift); .NET; Technical documentation; Software Development; Databases configuration & SQL, Version Control and Collaboration Tools (e.g., Git)* ***Abilities:*** • Result oriented, motivated, analyze complex technical problems and propose effective solutions. & passionate about coding.
User Interface Design Expert + Documentation expert	Key expert	1	9	At least, Masters degree (16 years of education) in Computer Science/ System Engineer/ System Design or relevant discipline.	• At least, five (04) years of relevant experience in UI/UX design, related certifications/diploma. & at least 02 years' experience as

| | | | | | business/system analyst. **Skills: Software Documentation; mockups; Proficiency in UI design tools (e.g., Adobe XD, Sketch, Figma) and front-end web technologies (HTML, CSS, JavaScript). Understanding of responsive design principles and mobile UI patterns. Good understanding of Databases & software.** |
| | | | | | • Must have worked on or participated in at least three different projects on database design. Demonstrated experience in design decisions to translate any given UI/UX developer journey into a smooth and intuitive interaction, Create, improve and use wireframes, prototypes, style guides, user flows, and effectively communicate |

					interaction ideas using any of these methods. • Excellent interpersonal and communication skills (oral and written) in English.
Quality Assuranc e Engineer	Key expert	2	6	Master's/Bachelor's degree (sixteen (16) years of education) in computer science, from a foreign or local university duly recognized by the Higher Education Commission (HEC) of Pakistan. Quality Assurance certification *__required__*.	*Qualification and Knowledge and Experience:* At least 05 years of experience as Software Quality Engineer. *Certified* QA Engineer. *Skills:* *Blackbox testing;* *Test cases documentation* *Abilities:* Attention to detail; Result oriented & motivated.
System Architect	Key Expert	1	6	At least, Masters degree (16 years of education) in Computer Science / Computer Engineering/ MIS/ Systems Engineering/ System Design or relevant discipline	• Minimum 8 years of relevant experience in System design, including process modelling, databases & architecture. • Exceptional writing/docum entation skills from technical & perspective. • Must have worked on or

					participated in at least three different projects on system architecture design
					• Sound understanding of Web & Windows Services, Encryption, and Web & application development in .Net/Java/PHP is required.
					• Sound design understanding of information system architecture to cater scalability, be flexible and be able to accommodate change.
					• Demonstrated experience on implementatio n & delivery of Web, desktop& mobile based multitier system.
					• Demonstrated experience with Windows / Linux and mobile (android) operating systems. Proven database experience with PL SQL, SQL / Optimization,

					MySQL, Oracle / SQL Server and JAVA
					• Ability to manage Application testing, from writing testing requirements, test cases & automated testing is a plus.
					• Experience with deploying fault tolerant and redundant system are a must.
					• Excellent interpersonal and communication skills (oral and written) in English.
Total	13	58			•

6 Annex

6.1 Annex – Item types

Sample Test Items

6.1.1 Multiple Choice Questions {MCQ}

MCQs: A. Stem
B. 4 Distractors
C. correct answer
D. Key

Multiple Language option should be available as per requirement (Sindhi, Urdu) and also define the Layout of Item with Answer keys in case of MCQs.

Item ID: _____

Grade	VI	**Unit**	1	**Chapter**	1	**Cognitive Level**	K/U/A
SLO:	Relate various theories of the origin of human life.						

Stem:
Scientists believe that most of human evaluation occurred on the continent of _____.

Options
    A. Asia
    B. Australia
    C. Africa

D. Europe

Key:

C Africa

Remarks of Reviewer
   a. Approved
   b. Approved after revision
   c. Rejected
   d. Any other

6.1.2   Constructed Response Questions {CRQ}

Item ID: _____

Grade	VI	Unit	1	Chapter	1	Cognitive Level	K/U/A
SLO:	Describe the importance of media in a democratic society						
Total Marks	3						

Stem: Describe THREE importance of media in democratic society

Response

1: _____

2: _____

3: _____

Possible Answers
   1. Improve the standards of information, education and entertainment.
   2. Enlarge the choice available to the people
   3. Provides opportunities to access information related to different fields of life such as news, current affair, science and technology, music, sports, and drama etc.
   4. Ensure accountability, transparency
   5. Creates opportunities of income generation at mass level

Marks Scheme

I mark for 1 correct repose

2 marks for 2 correct responses

3 marks for 3 correct responses

6.1.3   Extended Response Questions {ERQ}
       ERQs with stimulus/ statement/ diagram/ figure combined with answer keys, possible answers, key words and checking hints.

Item ID: _____

Grade	VI	Unit	1	Chapter	1	Cognitive Level	K/U/A
SLO:	Explain the origin of Human Life						

Total Marks	10

Stem: Describe major theories of huma life

Response

_____
_____
_____
_____

Possible Answers

The Theory of creation	God is the creator of the entire universe. God created man called Adam and his life - partner named as Eve from clay. God sent human as a caliphate on this earth. In this regard, God says in the Nobel Quran, "when your lord said to the angle, "I am placing a successor on earth".
The Theory of Evaluation	Charles Darwin was an English naturalist. While on a five-year journey around the world, he studied the differences in plants and animals. He explained his ideas on evolution in a book called "The Origin of Species. The theory of evaluation state the evaluation happen by natural section. The key point are that. 1. Individual in a species show a wide range of variation. 2. This variation is because of different in their genes. 3. The gens that allow these individuals to be successful are passed to their off spring.

Marks Scheme
I mark for each from above given key points

6.2 Annex – Summative assessment reporting format

a. Individual Level Reports

Name of Candidate: _____ Grade: _____ Section: _____ GR No._____ ___
Gender: _____: Name of School: _____ SEMIS ID: _____
Location: _____ Cluster: _____Union Council: _____
Talka: _____District: _____Division: _____

Subject	Knowledge Based Question		Understanding Based Questions		Application Based Questions		Total Marks	Obtained Marks	Remarks {Below Average/Average/Good/Excellent
	Total marks	Marks Obtained	Total marks	Marks Obtained	Total marks	Marks Obtained			
Sub-1									
Sub-2									
Sub-3									
Sub-4									
Sub-5									
Sub-6									
Sub-7									
Sub-8									
Total									

Comments:
_____
_____

b. School Level Reports

Name of School: _____ SEMIS ID: _____Location: _____
Cluster: _____Union Council: _____Talka: _____
District: _____Division: _____Year: _____
Grade: _____ Total Enrollment in Grade: _____ Total Students Appeared in Grade: _____

Subject	Average Marks in Knowledge Based Question		Average Marks in Understanding Based Questions		Average marks in Application Based Questions		Total Students Appeared	Total Marks	Obtained Marks	Remarks {Below Average/Average/Good/Excellent
	Total	Average Mark	Total	Average Mark	Total	Average Mark				

	marks	s Obtained	marks	s Obtained	marks	s Obtained				
Sub-1										
Sub-2										
Sub-3										
Sub-4										
Sub-5										
Sub-6										
Sub-7										
Sub-8										
Total										

Comments:

_____

_____

c. District Level Reports

District: _____Division: _____Year: _____
Grade: _____Total Enrollment in Grade: _____ Total Students Appeared in Grade: _____

Subject	Average Marks in Knowledge Based Question		Average Marks in Understanding Based Questions		Average marks in Application Based Questions		Total Students Appeared	Total Marks	Obtained Marks	Remarks {Below Average/Average/Good/Excellent
	Total marks	Average Marks Obtained	Total marks	Average Marks Obtained	Total marks	Average Marks Obtained				
Sub-1										
Sub-2										
Sub-3										
Sub-4										
Sub-5										

Sub-6									
Sub-7									
Sub-8									
Total									

Comments:

_____

_____

Charts showing assessment results

FIGURE 19. MEAN SCORE OUT OF 10, PHONEME ISOLATION TASK FOR GRADE 2 NON-READERS, FA3, SINDHI
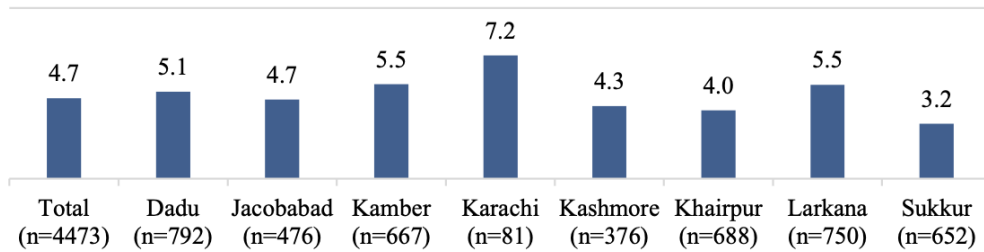
In FA3, non-readers were correctly able to name an average of 55 letters per minute in Urdu. Figure 22 below shows the average fluency rate in Correct Letters Per Minute (CLPM) for sampled non-readers in FA3 by district.

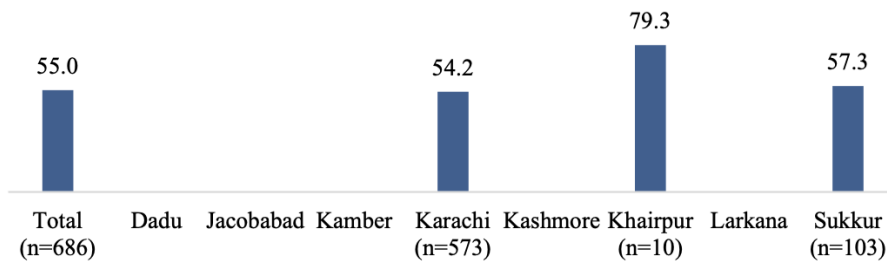**FIGURE 22. MEAN LETTER NAME FLUENCY FOR GRADE 2 NON-READERS, FA3, URDU**

Figure 23 shows the average oral fluency rate by district; Figure 24 shows the proportion of non-readers from FA1 who were non-readers in FA3, by district:

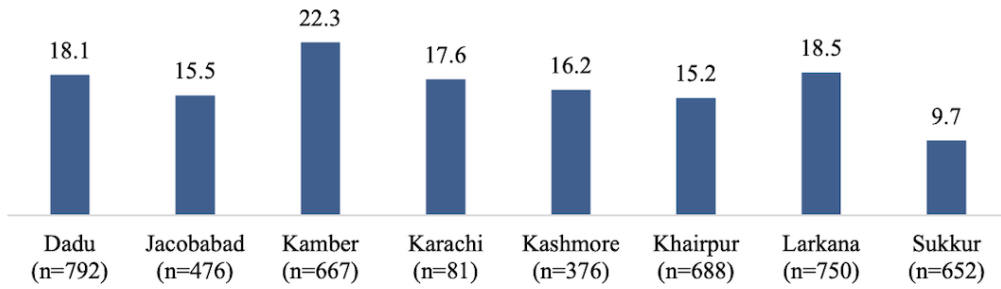## FIGURE 23. MEAN ORAL READING FLUENCY FOR GRADE 2 NON-READERS, FA3, SINDHI
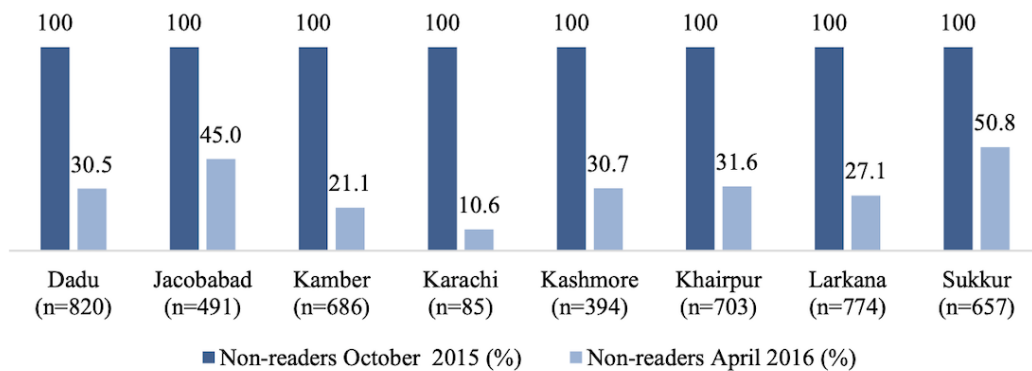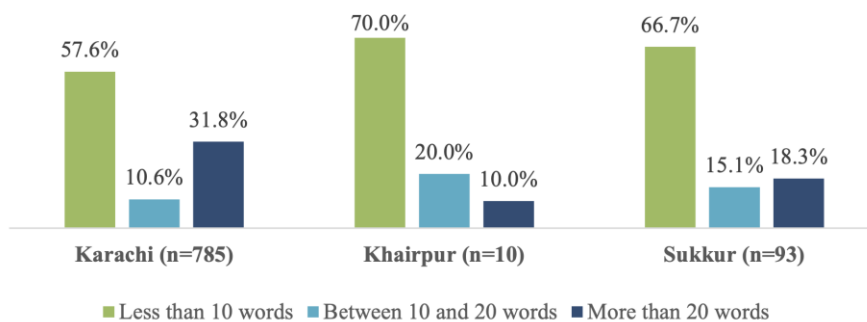

FIGURE 24. PROPORTION OF GRADE 2 NON-READERS IN FA1 AND IN FA3, SINDHI

Above reports are comparing the two time trends for improvement in reading capacity.

FIGURE 9. PROPORTION OF GRADE 2 NON-READERS IN OCTOBER 2015 WHO WERE ABLE TO READ LESS THAN 10 WORDS, 10 TO 20 WORDS, AND MORE THAN 20 WORDS IN FEBRUARY 2016 - URDU

6.3   Annex – Student enrollment data

Initial data collection of students data

Required field	Criticality	
Student Name	Mandatory	
Father's/Guardian Name	Mandatory	
B-Form Number	Preferred	Mandatory for generating any certificate from the system.
Date of Enrolment/ admission	Mandatory	
Father's/Guardian CNIC Number	Mandatory	Updatable
Relation with student		Updatable with previous
GR Number	Mandatory	
Mobile Number of Parents	Preferred	Updatable
Parent Email	Preferred	Updatable
Student Date of Birth	Mandatory	
Student Gender	Mandatory	
Student Religion		
School Grade / Class enrolled	Mandatory	updatable
SEMIS Code		
Student Mother tongue		
Mother CNIC	Preferred	
Address of student	Preferred	updatable
Unique Student ID	To be generated by the System centrally for entire student life	To be communicated back to students/parents after registering into the system.
Student with disability (Y/N)		
Remarks		Updatable