

TORs FOR HIRING OF IT FIRM TO DESIGN, DEVELOP AND DEPLOY SOLUTIONS TO BE USED TO IMPLEMENT SINDH EDUCATION MONITORING SYSTEM

Background

The Reform Support Unit (RSU) of the Department of Education and Literacy of the Government of Sindh coordinates the implementation of the Sindh Education Reform Program (SERP) by providing policy inputs and implementation-capacity building support for the improvement of education in terms of access, quality of education and governance. The Global Partnership for Education has recently introduced a new program to support the ongoing Sindh Education Reform Program (SERP II). One of the key components of S-GPE is to establish the Sindh School Monitoring System (SSMS). The fundamental role of SSMS is to collect, analyze, and disseminate data on key school-level indicators, including student enrolment and teacher presence. Data will be collected on a monthly basis to allow the emergence of trends and the 'real-time' response will facilitate in identifying the weaknesses. To promote governance and accountability, data collection will be carried out by independent monitors who report directly to the Director General Monitoring and Evaluation (DGM&E). By project closure, it is expected that the SSMS will be effective in all districts in Sindh, and that monitoring data informs tangible actions to improve school, sub-district and district level trends.

GoS recently completed a pilot exercise (first phase) in 5 districts where a sample of schools from each selected district was monitored through an application on smartphones. This data was collected through field staff using Android phones and sent via mobile data to be updated on an online management dashboard. The monitoring reports reflecting the current situation of schools, exact numbers with pictorial evidences are available online which can be viewed at any time.

GoS is now initiating the second phase where a more robust and elaborate handheld application, enhanced management dashboard and secure back-end infrastructure is required to scale up the monitoring program to at least 15 districts of Sindh within FY 2015-16.

Objectives / Rationale

The ELD requires services of a competent and professional IT firm/technology house to design, develop and deploy solutions that will be used to implement the Sindh School Monitoring System. This firm is required to develop and deploy scalable, robust and secure web and mobile based cutting edge solutions to cater to the requirements of the department and the project on a turnkey basis.

Tasks & Functions

Following are the main functions the firm is expected to perform:

- 1) User Requirement Analysis:

The firm will conduct a thorough needs assessment and develop scope/requirements documents to understand the scale of use, map process flows and organization structures, define data requirements, reporting formats and translate these into system requirements for development and support. The scope document will contain software/application features, forms and report templates, application and dashboard mock-ups/screen shots. The firm will also (in collaboration with the department) devise SOPs (standard operating procedures) for project engagement and implementation with the DGME office. Development of the solution will be based on the sign off/locking of the scope document.

2) Develop Mobile Application:

The firm is required to design and develop a mobile application for android OS to enable collection of data requirements that have been outlined in the School Monitoring Performa developed by the DGME and all other stakeholders. This application will be installed on handhelds provided to field staff and all data collected from monitoring visits will be entered, stored and submitted through this application. The application needs to be structured intelligently and appropriately to ensure ease of entry, quality management/validation/logical checks and constraints, access control, processing and convenient data transmission. The application should be able to support local language and have an intuitive/picture/icon based interface. Given data connectivity issues in rural areas, the application should be able to operate in both online and offline modes such that data stored for various schools is available as separate records and cannot be altered once saved. On availability of data connectivity, the application should be able to transmit the data forms stored to the back-end server.

The mobile app should be able to capture data fields like:

- Text data
- Numeric data
- Values from drop downs/checklists/radio buttons (these menus should be able to fetch data from other department systems)
- Location via GPS
- Picture / Video
- *(Sample Form to be developed through the application is available in Annex. Please note this form may change at various stages of the project)*

3) Servers, Databases and Back-end Services:

The firm will be responsible for proposing and setting up the required back-end infrastructure and services using a web and/or cloud setup to receive, store, sort and back-up all data collected from the field in real time. The requirements and specs for the server(s) and back-end should be able to support the volume and type of data that will be collected.

4) Management Dashboard:

The firm is expected to understand the reporting requirements of the DGME and develop online dashboards enabling real-time reporting from data received through the mobile app. The dashboards should have the following features as a minimum:

- Be accessible through an online interface aggregating different reports with multiple indicators accessible through user credentials
- Access controls to allow different administrative and viewing rights to various management tiers
- Tabs to allow access to different reports with granularity linked to reported data – Province, District, Tehsil, School, Staff Member etc.
- Storage of all raw data in tables as per the required reporting formats
- Visualizations to show data in aggregated tables, charts/graphs (pie, bar, line, stacked etc) and integration with Google maps to show location based data details
- Rule based visualization indices creating color coding based on data range definitions (e.g. Red below X%, yellow below Y%, green above Z% etc.) integrated with graphs and maps
- Heat maps based on rules applied to data values/ranges
- Target benchmarking through visualizations to enable quick views of achievement and deficits through regular tracking
- Aggregation options to report data/indicators over customizable time windows
- Options to export raw data in standardized formats like MS Excel / CSV
- Conversion of dashboard reports to PDF documents maintaining visual and data formats
- Email functionality to auto generate reports and mail PDF documents to defined circulation lists
- The reporting tool shall provide the provision of slice and dice the generated reports through multiple dimensions, aggregating, averaging facts,
- Tool shall have the interface for power users to fulfill the ad hoc reporting requirements of higher management without writing database queries.

The dashboard will be used by a range of target users and should be compatible with all popular browsers and be developed using transformative technology for access on phones and tablets.

5) DGM&E Portal

The portal shall have following sub systems (modules) to maintain the management dashboard and other allied components of SSMS

a. Users Management

In this module, multiple classification of users will be maintained with variety of privileges to specific users and their roles. For example, authorized users will have the provision of create user ID, assigning them systems roles according to their jurisdictions and positing locations. Application administrator will have features to regenerate password, activate / deactivate users etc.

b. Setup programs management

In this module number of screens will be required to develop to maintain the referential data tables such as districts, tehsils, union councils, schools etc. Module

shall also provide the provision to authorized users to download / upload referential data in excel formats.

c. Data integration services / utilities

In future, referential data will be required to be synced with other systems therefore portal shall have the capability to exchange data between SSMS and other systems through web services or scheduled OS level routines.

6) Database (Tables)

- The system shall use standard RDMS as its backend database which is easily available in Pakistani Market.
- The RDBMS provided in the system should have standard functionalities like Data backups , roll forward / roll back etc
- The system shall provide for defining / editing standard DB audit and control mechanism;
- The system shall provide provision for data archiving, for offline backups of data, at pre-defined frequency, to pre-defined extent;

7) Security

- System shall provide for controlling intrusion (hacking, virus attacks, etc.);
- System shall provide secure non-repudiation internet / intranet transaction environment by using latest available technologies like PKI, Security Certificates, hashing algorithm, Bio-metric technologies, etc.;
- The system shall provide for using any combination of authentication methods, such as password, PIN, thumb impression or any other biometric based authentication technique etc.;
- The system shall provide for role-based delegated user access management, including
- Password and PIN;
- Forgotten password and PIN;
- Centrally stored policies, roles, and credentials, propagated across various core modules that can be audit based managed by power users/ users with auditable administrative rights.

8) User Friendliness / Consistency

- The language for the system screens and front-end display must be in English. Option for display in local language may be an additional feature.
- The system shall provide context sensitive, content based, in-line/on-line user guide/help, for whole application;
- The front end application of the portal / dashboard should be web-based.
- The system shall provide consistent behavior of navigation;

- The system shall support template method to publish reports in HTML, Excel, PDF and CSV formats;
- The system shall support several report delivery channels such as printer, internet, fax and email;

9) Scalability

- Have ability to scale vertically/horizontally for user growth/ data expansion;
- To manage horizontal growth of hardware and software resources;
- Ability to add new modular interfaces based on new requirements.

10) Training of 464 Monitors/Field officers and staff at DGME

The firm will provide training to field and department staff in six different locations (6 regions) of Sindh by conducting workshops with hands-on training based on the following structure.

Audience	Training/Workshop Content
Field Staff – 464	Usage of mobile application on the phone to fill out and send monitoring forms and general smart phone usage like managing data connections over GPRS/EDGE, WiFi, settings etc.
Department/ IT Staff - 5	<p>Transfer of knowledge on use and customization of mobile app, server and database management of the deployed system, dashboard code and development and trouble shooting. Therefore, the firm shall handover following documents to DG M&E in addition to appropriate training sessions.</p> <ol style="list-style-type: none"> 1. Technical design document of mobile app, portal and management dashboard 2. ERD (entity relationship diagram) of database of SSMS system 3. Deployment Diagram <p>Note: All documents will be provided in hard and soft form with minimum 5 copies of each.</p>
Department Staff – 26	Use of mobile based forms for data collection in the field and use of management dashboard for accessing and understanding reported data.

The firm is also expected to develop a training manual with step by step description and system/application screenshots for future reference of new staff coming on board for all the training workshops that will be conducted. Boarding/Lodging and transportation of all audience is the responsibility of the firm.

Development of mobile application and testing	■												
Deployment of back-end services	■												
Training of Field Staff, Training Manual	■		■			■			■				■
Dashboard Phase I	■												
Training of IT Staff	■	■	■						■				
Dashboard Phase II		■	■										
Support and Maintenance		■	■	■	■	■	■	■	■	■	■	■	■
Training for Other Staff	■	■						■					■

Annex 1 – DGME Monthly Monitoring Form

SCHOOL INFORMATION:-

1. SEMIS code _____ 2. School name: _____

3. School Location: _____ 4. District: _____ 5. Taluka: _____
6. U.C: _____ 7. School type: _____
8.ECE/Kachi: _____ 9. School grade: _____
10. Medium of instruction: _____ 11. Campus School?: Y ___ N ___
12. School Status: _____ 13. Monitoring date: __/__/__
14. H/M Name : _____ 15. ADO Name & sign: _____

TEACHER POSITION (MALE):-

1. Sanction: _____ 2. Recruited: _____ 3. Posted: _____
4. Sanctioned leave: _____ 5. Non-sanctioned leave: _____.

FEMALE

1. Sanction: _____ 2. Recruited: _____ 3. Posted: _____
4. Sanctioned leave: _____ 5. Non-sanctioned leave: _____.

STUDENT OF EARLY CHILDHOOD EDUCATION (ECE):-

Enrolment: _____ Present: _____

STUDENT OF KACHI:-

Enrolment: _____ Present: _____

GRADE / LEVEL:

Class I: Enrol. G _____ B _____ Present G _____ B _____ Class II: Enrol. G _____ B _____ Present G _____
B _____ Class III: Enrol. G _____ B _____ Present G _____ B _____ Class IV: Enrol. G _____
B _____ Present G _____ B _____ Class V: Enrol. G _____ B _____ Present G _____ B _____ Class VI:
Enrol. G _____ B _____ Present G _____ B _____ Class VII: Enrol. G _____ B _____ Present G _____
B _____ Class VIII: Enrol. G _____ B _____ Present G _____ B _____ Class IX: Enrol. G _____ B _____
Present G _____ B _____ Class X: Enrol. G _____ B _____ Present G _____ B _____

LABORATORY:-

Physics: _____ Chemistry: _____ Biology: _____ Computer: _____
General Science: _____

SCHOOL FACILITIES:-

Boundary Wall: _____ Water: _____ Toilet: _____
Electricity: _____