

Inception Report Submitted for:

Education Sector Information Management System

Submitted to:

Submitted by:

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Introduction

In the Cox's bazaar District there are about 912,852 Rohingya who have taken up refuge as of August 2019. This has had an impact for the worse for the hosting community as well. One of the worst hit aspects of life has been the education sector. About 1.2 million people are affected altogether. These people need assistance that is transparent and effective so that the 683,000 children in crisis don't lack basic education in this plight. Education Sector Joint Response Plan (JRP) has been able to identify 462,400 children and youth, and provide access to education for about 324,367 of them. There are about 5495 learning facilities used for this purpose. These facilities report enrolment and other relevant data to the JRP. These Data are copious and have no central management tool. The excel templates are filled up manually on a fortnightly basis. There are about 40 information managers of education sector partners on fortnightly basis. This takes a huge toll on manpower. The data is managed in an excel based database by the information management officer (IMO). This system is far from ideal. Storage, Collection and Analysis is growing in an exponential rate which needs to be manageable. The reliability and integrity is paramount to give proper information about the current situation and effectiveness. It needs a radical change to create meaningful reports for all parties to freely assess and analyze the situation.

A few matters needs to be addressed urgently for the system, there is a dearth of validation checks on the data. The Excel spreadsheet has no validation mechanism. There needs to be some sort of validation mechanism to maintain data integrity and eliminate major errors. In this regard, for existing data we may allow all data to be imported but for new entries we will prevent insertion of any duplicate data with the validation of defined field in SRS.

There needs to be activity logging, as there needs to be a mechanism to revise the previous versions of the data to backtrack and audit control. If erroneous data is found there should be a

mechanism to revert. There should be security levels for the access to the data as not all levels of users will have access to the same data. The data collection procedure is long and can benefit from proper scheduling and time maintaining. Without properly available data in real time the picture of the efficacy cannot emerge. There needs to be a proper dashboard to visualize the data at a glance to get a clear picture of the operations. There are a lot of duplicate records popping up due to this ungainly system. This puts the validity of the actual records in jeopardy. The education sector database provides the official progress indicators for education response. Therefore it is critical that the data is reliable. We need to address the technical gaps and information Management system.

Objective of the project

A web based system needs to be developed that meets the demands. They include- tracking status of enrollment by age group, grade, teacher training, and quality of learning place and community engagement. There should be mechanisms to generate reports on children per demographic attributes (age, disability sex). There should be support for tracking and reporting based on JRP indicators. Also the reports must include geo mapping. The data will be filtered by status and type. There should be also support to map the areas without education facility. These mapping can be done using the mobile device GPS system and field workers who are on the ground. The geo map must properly visualize the picture of education status and improvement. The system will facilitate the storage, analysis and reporting for the education sector data. It should also include a proper dashboard visualizing the GIS locations of the learning facilities and the funding of agencies and implementing partners.

For this to take shape in reality, the SRS document needs to be finalized by analyzing the 5W tool. Its service processes and workflows will be taken into consideration. The user and functional requirements needs to be studied and documented. Then it will be signed off by the technical committee. Using the SRS document as a guide the MIS system must be designed. The design will consider all aspects including the core modules of the Software solution. The application should include appropriate features for data entry, data quality auditing, trend analysis, dynamic queries, standard reports, visualizations including maps, generation of factsheets, comparisons, Geo locations, real-time data system among others as per requirements. A mobile data collection tool will be developed to support the organized collection of data in the field and organize the collected data in the Web. The mobile data

collection tool must be designed and developed with the target audience in mind. Once it is developed and tested it should be uploaded to the UNICEF Google play account for easy accessibility. The technology infrastructure should be designed and provide access to the hosting. Both Backend and frontend should be accessible to all relevant parties. The Architectural design should consider application (both) requirements, data flows, database requirements and reporting.

Current Status

Currently the Data is collected manually by the information managers using the 5W template.

There are about 40 education sector partners who assist JRP to manage this data. The data is collected fortnightly. The Data is managed in an excel based database. The database is maintained by the information management officer (IMO). Currently the data has grown exponentially in the last 24 months. The current system lacks validation, activity traceability, scheduling, and management.

As for the current system, the 5w format uses these mechanisms to work, IM-Education Sector splits the updated 5w raw dataset (in Excel) for 38 partners according to their role, Also adds new learning facility information which registered in Facility Registration System (FRS). Then they Protect the table format and formula of 38 excel and sends the 38 different excel files to different 5W data focal points with some guidelines in email. Then the 38 partners fill-up the update information in given excel format and sends it back to IM-Education Sector by email. After that, IM-Education Sector collect all the update excel file from email. If any partner misses the deadline then IM-Education Sector uses the previous information because the data reporting system use cumulative values. Next the IM-Education Sector compile 38 excel file in to one excel file using copy-paste. After that, IM-Education Sector write excel function and pivot tables in summary reporting sheet. Next the education Sector develops presentation for biweekly Education Sector meeting, gap analysis and dashboard sheet. Then IM-Education Sector upload & share the summary table and dashboard to public Dropbox for all partners. Finally, IM-Education Sector upload update 5w raw dataset, summary tables and dashboard to private Dropbox.

Stakeholders and Key Personnel

UNICEF

Name	Role	email	Telephone
Muntashir Arefin	Primary Project Contact	marefin@unicef.org	+8801521505103
Charles Avelino	Education Manager	cavelino@unicef.org	
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Kaz Software

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Implementation Plan

Project Management

The project will be implemented by a dedicated project team led by a project manager (PM).

The PM will coordinate all the activities of the project and interface with stakeholders at UNICEF to coordinate project activities such as requirements analysis, software feedback and UAT activities, deployment strategies and training activities.

The project will be run using the Agile methodology (see below in methodology section) with an iterative development cycles strategy. Each cycle will result in testable product that will be used to gather early feedback.

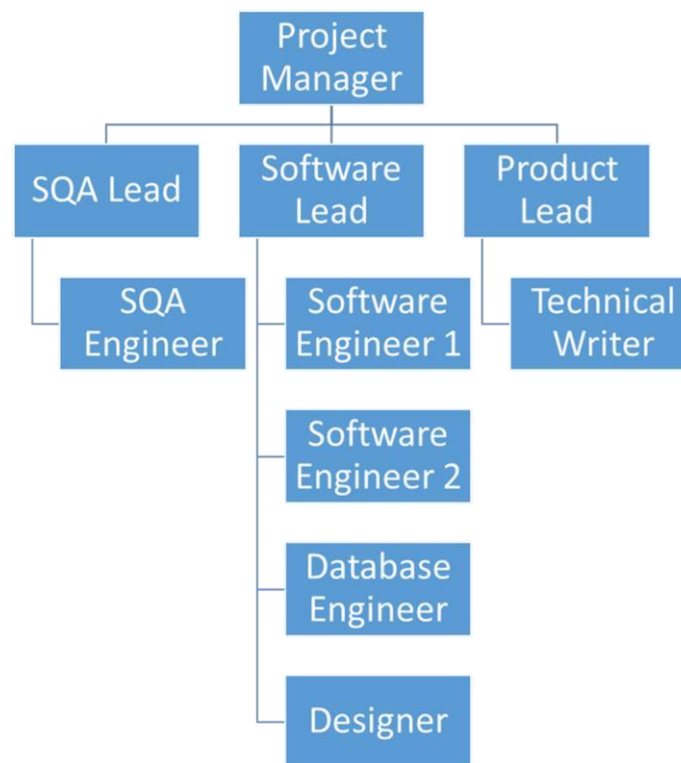
Kaz Project Team

The project will be led by the Project Manager (PM) who will be the primary contact for all communications with UNICEF and Kaz.

The development team will consist of a Technical Lead (TL) who will also be the architect for the platform. The TL will be assisted by 2 Software Engineer, a designer and a Database Engineer. The SQA team will consist of 2 SQA Engineers.

The requirement analysis, SRS, documentation and finally the training will be conducted by a products team consisting of the SQA team lead and a 1 technical writer.

The following schematic shows the team structure.



Requirements analysis and specification

The final requirement for the application will be finalized by discussion with UNICEF. The Wireframes/Story boards and the SRS will be developed in Collaboration. A plan of action with specific deadline will be sent to UNICEF to approve. The assessment will consist of the analysis of the 5W tool, conducting meetings with the stake holders to clear the current processes, data flows and requirements. Final and approved SRS document with user and functional requirements will be documented.

Data migration plan

In collaboration with UNICEF the best database Designs and schemas that we can fit in the data structures will be decided and the plan will be developed.

A set of scripts will be developed to migrate the existing data into the new database scheme.

Software development plan

The design of the MIS system needs to be done using the SRS Document, then the architectural design of the system will be done. After that the Mobile data collection tool will be developed that will work seamlessly with the collected data.

End Product/deliverables

- Design document including Software architecture design, dataflows, and database produced.
- Technical Architecture of the system agreed with the Education Sector Technical team
- Report on field readiness assessment including technical and infrastructure readiness
- First iteration of Prototype of MIS with integrated dashboard and Tool for Data collection
- Documentation on Hardware and resource requirements
- Requirements for Hosting web application documented

Testing and Deployment plan

There should be a User Acceptance Test or UAT conducted by various stakeholders to ensure the efficacy of the system. The system also needs to be tested for vulnerability for security concerns. The system will also have to be tested for vulnerabilities to ensure data integrity and security of records and report submitted to UNICEF.

End Product/deliverables

- Functional User Acceptance and vulnerability tests conducted and signed off
 - Non -functional load testing for concurrent user scenario simulation □Assurance of application of Security layers such including SSL.
- Final Web based, and mobile application signed -off.

Training and capacity building

Training must be facilitated for the end users for easy usage. A Easy to use manual must be developed for everyone to use

End Product/deliverables

- Training manuals developed and shared with all stakeholders
Trainings and workshops.
- Admin, installation and reporting manuals.

Maintenance plan

Provide maintenance for 1 year after implementation.

Technical and Project Approach

Overview of technology plan

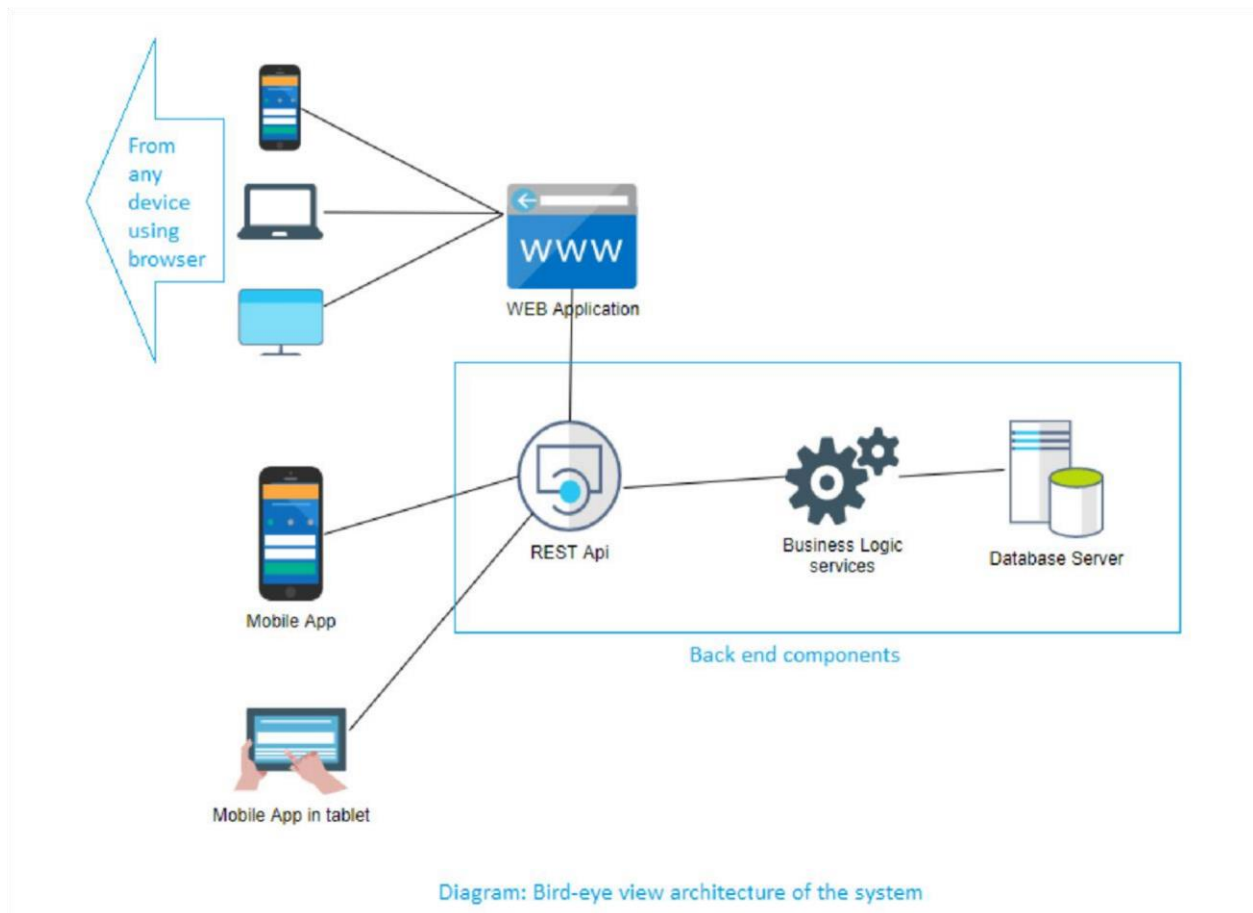
The application will be structured in the client server architecture. The server application will contain all business logic and the actual data in a database. The client side will be the browser in desktops/computers. We expect to build the web portal as a responsive site which will enable it to be viewable in any device including mobile browsers. Our system is operating system independent so we can deploy and maintain this either in Linux or macOS or Windows. So we can deploy everything in Linux server that means no worry about any additional licensing.

We will use C# language using dotnet core platform based web application to create the server-side and a javascript platform based (e.g. angular.js) responsive front end. We expect to use open-source graphing libraries for creating the graphs and charts if those are required.

The backend database will be MySQL. The server side will be exposed with REST interfaces. The data transfers will also be minimal using JSON to keep the overall communication low. Rest interface API will service the Android application.

The Android application will be built with native code.

For authentication we plan to use JWT token based authentication mechanism which is very robust, secured and easily extensible. Another key point is that we will maintain client end data storage upto a certain level so that it can work in offline too which going to be synced bi-directional once internet is available. We will enlist the user's data that we are going to collect in SRS documentation so that privacy-policy can be determined. Also, for all sensitive data we will use standard encryption to protect user's data which means even if database is accidentally exposed, users sensitive data cannot be read without our decryption logic.



Quality Control

We expect to do the quality control at several levels. Each storyboard will go through our agile testing process, which has been widely adopted in the software industry as the most complete and responsive testing scheme. The agile testing process follows the following steps:

1. Developer desk testing:

Once a story or part of a story is completed an informal testing session will be done at the developer's own desk where both the developer and the QC (quality control) engineer will walk through the story to identify issues at the surface level. An emulator will be used this stage for running the tests. This agile testing process shortens the QC process by identifying issues early on the development process.

2. Integration testing:

Once the issues found at the developer's desk are resolved the QC will then create a build to run the integration tests. The goal of this phase is to check if the features developed work with the rest of the features in the application.

3. Automated or semi-manual regression testing

A testing regime will be setup for running automated or semi-manual regression testing of builds. The aim for automating the process will be to get to issue faster on newly created issues where the features were working in previous builds.

4. Usability testing

Testing will be setup with user groups (selected from target user groups, e.g. researchers) to test the usability of the application when the application has reached a point where some of its features are usable.

Documentation and Training

Once the application has reached feature complete state our content team will start documenting the application and create manuals for the administration panels so that Unicef personnel can use those to maintain and update the data. We will also give hands on training to appropriate resources as required.

Project Methodology

We propose using Agile with a Kanban format and suggest adopting agile support tools for task management for this project.

The basic agile methodology takes the following key points as its principles of process:

- Customer satisfaction by early and continuous delivery of useful software
- Welcome changing requirements, even late in development
- Working software is delivered frequently (weeks rather than months)
- Close, daily cooperation between business people and developers
- Projects are built around motivated individuals, who should be trusted
- Face-to-face conversation is the best form of communication (co-location)
- Working software is the principal measure of progress
- Sustainable development, able to maintain a constant pace
- Continuous attention to technical excellence and good design
- Simplicity—the art of maximizing the amount of work not done—is essential
- Self-organizing teams
- Regular adaptation to changing circumstance

Change management

In agile methodology we follow (Kanban) change management is simple. All iterations are short and driven by top issues of a Kanban task board. A request for change will be analyzed by the project team both by Unicef and Kaz members. In most cases the change requests will be generated during our user feedback sessions and will be well thought out anyway. Once the change request is finalized and agreed on a priority will be set on it to decide which iteration it should be adopted in. Pushing in a change in this iterative model does not have a large detrimental effect as it does on other more structured methods of software development.

The development process

The development process run in an iterative cycle. With iteration giving an end product that we can test and use to give feedback.

The process starts with a preparation stage where requirements are prioritized, discussed and reviewed. Usability analysis and other technical analysis can also be part of this preparation stage. The goal of this stage is to finalize a list of issues/tasks that will need be accomplished in that iteration. This list then goes into the top of product backlog – which is a master list of issues to be done for the product. We will use git issue track for maintaining this backlog. This backlog is always visible to clients.

A sprint (an iteration) planning is then done with the development team (and in some cases with the client) to finalize and communicate the goals and tasks of that iteration.

This is followed by daily reviews of work, standup meetings (adopted from Scrum) and daily product builds. These builds are visible to clients. And part of the daily process is to seek feedback about the builds – which is typically formalized into a weekly meeting for feedback.

At the end of the iteration the product reaches a release state for that version.

This is followed by a review of the sprint to assess shortcomings, re-align issues and document any issues that have not been covered.

The process then starts again with sprint retrospective and preparation stage for the next cycle.

The schematic below shows this process in a high level point of view.



Work plan and timeline

UNICEF Education Sector Management System	2020					
Particulars	11 June to 18 June	19 June to 19 July	22 July to 22 October	23 October to 22 November	23 November to 30 November	1 December to 10 December
Inception Report						
SRS						
Development Cycle 1						
Development Cycle 2						
Training						
Final Delivery						

Conclusion

We look forward to working with **UNICEF** in this project, and we are excited the possibility of making a world class application that will help UNICEF with its work in JRP.