**TERMS OF REFERENCE FOR INDIVIDUAL CONTRACTORS/ CONSULTANTS**

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| **PART I** | | |
| Title of Assignment | **Solution Architecture for Education Digitalization and Integration of Education Information Management System (EMIS)** | |
| Category of the Consultancy | **International or National Individual Consultancy** | |
| Proposed level of Consultancy | **Senior** | |
| Section | **Education** | |
| Location | **Kigali, Rwanda** | |
| Duration | **6 months** | |
| Start date | **From:** 1 April2021 | **To:** 30 September 2021 |

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| **PART III: Signatures** | | | |
| **Function** | **Name** | **Signature** | **Date** |
| Prepared by | **Evans Atis**  Education Specialist |  |  |
| Reviewed by | **Alphonse Nyandwi**  **ICT Specialist** |  |  |
| Reviewed by | **Brian Nyakanda**  HR Specialist |  |  |
| Approved by | **Nathalie Hamoudi**  Deputy Representative |  |  |

**Background**

An Integrated Education Management Information System (IEMIS) is a critical tool for providing the education sector with accurate and relevant information to inform its policy decisions and implementation approaches. Although the Ministry of Education (MINEDUC) and its agencies have data and information systems in place, inefficiencies in those systems reduce the effectiveness of planning, management and decision-making processes and, ultimately, compromise the quality, sustainability and equity in education.

In 2019, MINEDUC with support from UNICEF, conducted an in-depth analysis of the education sector business structure and processes, with focus on data needs and utilization, as well as information systems and the technology architectures currently in use. The aim of the study was to lay foundation for the establishment of an Integrated Education Management Information System (IEMIS).

The study pointed out the existence of multiple systems that collect the same data multiple times from the same source (redundancy), which leads to the fact that current applications, systems and technologies are:

* Only meeting some of the needs of various education institutions, but are inadequate to support the overall education business structure and processes;
* Implemented without regard to common standards and an interoperability framework.

Consequently, MINEDUC in partnership with UNICEF, and through the support from MasterCard Foundation, is aiming to improve the overall education management information system by addressing issues related to covering the full business processes re-engineering and automation needs in the sector taking into consideration students, teachers, parents, and other stakeholders journeys at different levels of the education system. To achieve this aspiration, a digitalization roadmap for the education sector is being developed to guide future investment in the sector.

In this regard, an experienced Solution Architect is being recruited to contribute to the development of the digitalization roadmap through a comprehensive analysis and design of:

* Functional, and non-functional requirements of the future IEMIS
* Information architecture for the IEMIS (Data architecture including production, analysis, information accessibility and use, application architecture including software models);
* Infrastructure architecture for the IEMIS (technology, networks, ….).

The consultant is expected to produce a detailed solution architecture and a related project implementation guide for an Integrated Education Management Information System (IEMIS) which will automate identified manual processes and improve on the automated ones for a better service delivery and education related data management. The consultant will also complement and work with the team in charge of developing the digital transformation roadmap of the education sector.

**Justification**

One of the key strategic priorities in the Rwanda Education Sector Strategic Plan 2018-2023 (ESSP) is to strengthen governance and accountability across all levels of education in Rwanda. Specifically, MINEDUC is focusing its efforts on, among others, improving data collection and management processes in order to ensure relevant and efficient planning processes and accountability between the local, district and national levels.

The present technical assistance is directly aligned with priorities identified in the ESSP and responds directly to needs identified in the Rwanda education sector by the Ministry of Education (MINEDUC), its agencies, the University of Rwanda, district and sector education units, schools, development partners, and other relevant stakeholders. It will provide support to the education system and a clear impetus for strengthening the analysis, dissemination, accessibility and use of education data.

**Objectives, Expected Results and Scope of Work**

***I.-Objectives***

The overall objective is to create solution architecture for the overall education sectorThe objectives of this consultancy is to:

* Develop and implement education metadata standards and an interoperability framework;
* Design a detailed solution architecture for the proposed IEMIS;
* Develop a guide project document for the development of IEMIS and product acceptance;
* Provide technical assistance to the development of the education sector digital transformation roadmap in collaboration with experts in business analysis and enterprise architecture.

***II.-Expected results***

1. The education metadata standards and interoperability framework are available and fully implemented;
2. A detailed implementable solution including both functional and technical architecture for the proposed IEMIS is designed and available;
3. Guidance for the development of IEMIS and product acceptance is developed;
4. Technical contribution is made to the development of the education sector digital transformation roadmap.

***III.- Scope of Work***

*a.- Approach*

The Solution Architect will work closely with MINEDUC, the Rwanda Information Society Authority (RISA), Rwanda Education Board, Rwanda Polytechnic, Rwanda TVET board, University of Rwanda, Higher Education Council and other experts in enterprise architecture, education business analysis, software development and all relevant education officials to ensure that the sector’s needs are met.

The assistance will focus on matching the IEMIS solution with the education sector’s business processes, creating a solution prototype and guiding the solution development, in aligniment with development of the digital transformation roadmap of the education sector.

The overall technical solution details shall be translated into a language that management and non-technical stakeholders can understand. All key stakeholders shall be informed about product development processes, costs, and budgeting.

*b.-Major Tasks, Deliverables & Timeframe*

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| **Tasks** | **Deliverables** | **Means of verification** | **Timeframe** |
| **A.- Matching the IEMIS solution with the Education sector’s requirements.** | | | |
| Consult key stakeholders to assess metadata needed in the education sector and define a comprehensive education data dictionary. | Comprehensive metadata model and data dictionary as well as an interoperability framework for the education sector. | A report that documents the metadata standards, the availability and functionality of the education metadata system, as well as the education sector interoperability framework. | 1 month |
| Support an assessment to understand the alignment between current digital technology and the education business processes in Rwanda, including how all parts of the IEMIS will work together including services, processes, data, application and technology. | Detailed workflow mapping, data flow diagram, and detailed entity relationship diagram for the overall education sector and the proposed IEMIS. | A report that documents the alignment between digital technology and the education business processes in Rwanda, detailed workflow mapping, data flow diagram, and detailed entity relationship diagram for the proposed IEMIS. | 15 days |
| Analyse and document comprehensive functional requirements  and non-functional requirements including but not limited to security, performance, maintainability, scalability, usability, and reliability for the education sector and the proposed IEMIS. | Detailed functional and non-functional requirements for the overall services of the education sector and the proposed IEMIS. | A report that documents the functional and non-functional requirements for the overall services of the education sector including the proposed IEMIS. | 15 days |
| Provide the best technical solutions among possible options for the digital transformation of the education sector and to develop an integrated EMIS including phases and implementation requirements. |
| Provide specification for managing and delivering the digital transformation of the education sector, including the integrated EMIS. |
| **B.-Creating a solution prototype** | | | |
| Analyse different practices associated with platforms, programming languages, and tools. | Detailed integration architecture, including application, technology and deployment architecture models for the education sector and the proposed IEMIS making reference to the GoR’s Enterprise Service Bus and Business Intelligence Solution. | A report that documents integration architecture, including application, technology and deployment architecture models for the education sector and the proposed IEMIS which feeds into the overall education digitalization roadmap. | 3 months |
| Design a specific architecture solution for the education sector including the integrated EMIS that fits best. |
| Describe in details what components the IEMIS consists of, how those components communicate with each other, how and where different parts are deployed to and how the IEMIS system in general fulfil the user requirements. |
| Select appropriate technology stack in conformity with RISA’s guidelines and leading practices. |
| Support the finalization of the education sector digitalization roadmap. |  |  |  |
| **Guiding and controlling the solution development** | | | |
| Compiling a project document for the development of the IEMIS including detailed tasks, timelines, and deliverables. | Detailed user acceptance guide and strategy document for IEMIS development. | A report which incorporates the user acceptance guide and strategy document for IEMIS development. | 1 month |
| Monitoring the implementation of the developed solution architecture and providing regular reports. |
| Developing a user acceptance strategy guide including iterations and acceptance criteria. |

**Desired competencies, technical background and experience**

The solution architect should have broad knowledge across a wide spectrum of established and emerging technologies and products that can be used to implement a desired IEMIS solution. She/he must have:

1. At least a master’s degree in Computer Science or Software Engineering.
2. A technical background with at least eight years of work experience in one or more IT areas including but not limited to:
   1. IT architecture, infrastructure, and cloud development
   2. Engineering and software architecture design
   3. Business analysis/system design
   4. DevOps
   5. Project and product management
3. Vast experience in:
   1. Development of Metadata and Data Lineage Solutions for multiple data sources across on-premise and cloud environments in accordance with Data Governance Standards, Policies and Procedures.
   2. Conceptual, logical and physical data modelling and data dictionaries and semantics, syntax and taxonomies.
4. Advanced knowledge in:
   1. Best practices regarding system security measures
   2. Software modelling tools for -graphics and diagramming
   3. Software engineering and design architecture
   4. Business analysis techniques and processes
   5. Typical enterprise integration patterns
   6. Principles of computer networks and IT security management
5. In-depth understanding of
   1. Coding languages (Java, JavaScript).
   2. Various operating systems and databases.
   3. XML, PHP, Python, Java, JavaScript, SSL, Apache, MySQL SQL, PostgreSQL, Linux, Nginx, Windows server 2012 or newer.
   4. Web Services, RESTFUL, or SOAP APIs, as well as experience writing fault-tolerant and secure code.
6. Demonstrated ability to work productively with government and national systems.
7. Knowledge of the Rwandan Education system is an asset.
8. Good analytical, problem-solving, planning, organizing, facilitation and communication skills.
9. Fluency and excellent writing skills in English are required, Kinyarwanda desirable.

**Evaluation Criteria**

Technical and Financial proposals will be assessed based on 70 % technical and 30% financial criteria for each component**.** Applicants must score a minimum of 49 points on the Technical Proposal and meet the mandatory qualifications listed below to be considered technically compliant for the component, and in order for the financial proposal to be assessed.

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| **Technical Evaluation** |  | **Max** | **Min** |
| **1.- Overall Response & Methodology** | **Max Score** | 20 | 14 |
| Understanding of scope, objectives and completeness of response | 10 |
| Quality of the proposed methodological approach and implementation plan | 10 |
| **2.- Consultant Profile** | **Max Score** | 50 | 35 |
| Cosultant experience | 20 |
| Technical expertise of the consultant | 30 |
| **Total Marks For Technical Component** |  | **70** | **49** |
| **3.- Financial Proposal** |  |  |  |
| Full points are allocated to the lowest priced proposal that meets the minimum score on the technical proposal. The financial scores of the other proposals will be in inverse proportion to the lowest price. |  | **30** | N/A |
| **Total Marks** |  | **100** |  |

**Payment Schedule**

The payment schedule will be based on the delivery of quality final products. The timeframe for each stage of the consultancy should be presented in the technical proposal and the payment schedule in the financial proposal. Payments will be made only based on the quality completion of deliverables, as approved by the MINEDUC and UNICEF.

UNICEF reserves the right to withhold all or a portion of payment if performance is unsatisfactory, if work/outputs is incomplete, not delivered or for failure to meet deadlines.

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| **Deliverables/Reports** | **Timing** | **Payment Schedule** |
| A report that documents the metadata standards, the availability and functionality of the education metadata system, as well as the education sector interoperability framework. | 1 months | 30% |
| A report that documents the alignment between digital technology and the education business processes in Rwanda, detailed workflow mapping, data flow diagram, and detailed entity relationship diagram for the proposed IEMIS. | 15 days | 15% |
| A report that documents the functional and non-functional requirements for the overall services of the education sector including the proposed IEMIS. | 15 days | 15% |
| A report that documents integration architecture, including application, technology and deployment architecture models for the education sector and the proposed IEMIS which feeds into the overall education digitalization roadmap. | 3 months | 30% |
| A report which incorporates the user acceptance guide and strategy document for IEMIS development. | 1 month | 10% |

**General Conditions: Procedures & Logistics**

In support of MINEDUC, UNICEF Rwanda will be responsible for selection and administrative supervision of the consultant. The consultant will report to UNICEF on all contractual and technical issues and will work closely with and report to MINEDUC on a daily basis.

The products and deliverables of this consultancy are not the property of the consultant. No deliverables may be shared or published without written permission from MINEDUC and UNICEF. MINEDUC and UNICEF will be free to adapt and modify them.

UNICEF Country Office and MINEDUC will avail working space as required.

**How to Apply**

Qualified candidates are requested to submit their **Technical proposal** that includes the consultant’s overall understanding of the terms of reference, relevant expertise and experience for this assignment, the proposed approach to the consultancy, a workplan and a realistic implementation timeline and relevant documentation of previous assignments to demonstrate level of expertise. The proposal must include the consultant’s CV, as well as three references’ contact information and P-11 form <https://www.unicef.org/about/employ/files/P11.doc> .

The application is submitted to the provided online portal before the indicated deadline on the advert.

**Financial proposal:** Only candidates who qualify for the technical proposal will be contacted for submitting a financial proposal outlining the total costs for this consultancy with payment linked to the four main tasks outlined above

*UNICEF has a zero-tolerance policy on sexual exploitation and abuse, and on any kind of harassment, including sexual harassment, and discrimination. All selected candidates will, therefore, undergo rigorous reference and background checks.*

Only shortlisted candidates will be contacted.