

TECHNICAL REQUIREMENTS – CUSTOMIZATION OF CURRENT LEARNING MANAGEMENT SYSTEM

Notes on the Technical Requirements

The technical requirements define the system for Learning Management system. The objective is to customize ZEP-RE's current Moodle Learning Management System.

Table of Contents: Technical Requirements

1.	Acronyms Used in The Technical Requirements.....	3
	Acronym Table.....	3
2.	Functional, Architectural, Performance, and General Technical Requirements	4
2.1.	Legal and Regulatory Requirements to be met by the LMS.....	4
2.2.	Business Function Requirements to be met by the LMS.....	4
2.3.	Architectural Requirements to be met by the LMS.....	6
2.4.	Systems Administration and Management Functions Required to be met by the LMS.....	6
2.5.	Performance Requirements of the LMS.....	7
2.6.	General Technical Requirements.....	8
3.	Service Specifications – Supply & Install Items.....	8
3.1.	System Analysis, Design and Customization/Development.....	8
3.2.	Software Customization / Development.....	8
3.3.	System Integration (to other existing systems).....	8
3.4.	Training and Training Materials.....	9
3.5.	Data Conversion and Migration.....	9
3.6.	Documentation Requirements.....	9
3.7.	Requirements of the Supplier’s Technical Team.....	9
3.8.	Telecommunications Services (Supplier-provided).....	10
4.	Testing and Quality Assurance Requirements.....	10
4.1.	Inspections.....	10
4.2.	Pre-commissioning Tests.....	10
4.3.	Operational Acceptance Tests.....	11
5.	Service Specifications – Recurrent Cost Items.....	12
5.1.	Warranty Defect Repair.....	12
5.2.	Technical Support.....	12
5.3.	Requirements of the Supplier’s Technical Team.....	12

1. ACRONYMS USED IN THE TECHNICAL REQUIREMENTS

Acronym Table

Note: Compile a table of organizational and technical acronyms used in the Requirements. This can be done, for example, by extending the following table.

	Term	Explanation
	API	An application programming interface It is a type of software interf offering a service to other external systems or platforms
	DBMS	Database Management System
	LMS	Learning Management System
	LCMS	Learning Content Management System
	LXP	Learning Experience Platform
	LRS	Learning Record Store
	SCORM	Sharable Content Object Reference Model
	SSO	Single Sign-On (User authentication Service)
	CMS	Course Management System
	VLE	Virtual Learning Environment

2. FUNCTIONAL, ARCHITECTURAL, PERFORMANCE AND GENERAL TECHNICAL REQUIREMENTS

2.1. Legal and Regulatory Requirements to be met by the LMS

2.1.1. The System MUST comply with the following laws and regulations:

2.1.1.1. Kenya Data Protection Act 2019

2.1.1.2. Ethiopia Computer Crime Proclamation No. 958/2016

2.2. Business Function Requirements to be met by the Information System

.. drive objectives

This Learning Management System (LMS) will create, manage, and deliver online courses and training materials.

It will support various media formats, such as text, video, audio, and images as well as allow for the creation of assessments, quizzes, and exams to evaluate student progress.

It will provide tracking and reporting capabilities to monitor student engagement and performance.

It will allow for communication and collaboration tools such as discussion forums, messaging, and group work and have a robust system for managing user registration, authentication, and access control.

The system should be able to integrate with other systems such as Single Sign-On, Payment gateway and analytics.



2.2.1. The Information System MUST support the following business functions.

Technical Requirements for Customizing Moodle:

1. **Course Management:**
Custom course templates for different types of courses (e.g., self-paced, instructor-led). Enhanced course creation and editing capabilities for instructors. Integration with external content repositories. Bulk course enrollment and management features.
2. **User Management:**
Custom user roles and permissions to align with the organization's structure. Single sign-on (SSO) integration with the existing authentication system. Automated user enrollment and synchronization with external systems (e.g., HRIS). Enhanced user profile customization options.
3. **Assessment and Evaluation:**
Customizable assessment types (quizzes, assignments, surveys, etc.). Advanced question types and grading options. Support for plagiarism detection tools. Automated grading and feedback features.
4. **Communication and Collaboration:**
Integrated messaging and notification system. Real-time chat and video conferencing capabilities. Discussion forums and collaborative spaces. Calendar integration for scheduling events and deadlines.

5. **Learning Progress Tracking:**
Customizable learning pathways and learning objectives. Progress tracking and reporting for learners and instructors. Integration with learning analytics tools.
6. **Auditability:**
Detailed activity and event logging for auditing purposes. User access and activity history tracking. Compliance with relevant data protection regulations.
7. **Integration:**
Integration with third-party tools and platforms (e.g., LMS plugins, content authoring tools). Support for standards like SCORM and xAPI for content interoperability. API documentation for custom integration development.
8. **Reporting and Analytics:**
Customizable dashboards and reporting modules. Learning analytics to assess learner performance and engagement. Data export options for further analysis.
9. **Mobile and Offline Support:**
Mobile-friendly and responsive design. Offline access to course content and activities. Mobile app customization and branding.
10. **Customizable and Brandable:**
Ability to customize the Moodle theme to reflect the organization's branding. Custom branding of login pages, emails, certificates, etc.
11. **Accessibility:**
Compliance with accessibility standards (e.g., WCAG). Support for assistive technologies.
12. **Registration:**
Customizable registration forms for different user types (learners, instructors, administrators). Integration with payment gateways for paid courses.

Scope of Work for Customization:

The consultant or firm will be responsible for the following tasks:

Requirement Gathering: Conduct detailed discussions with stakeholders to understand their specific needs, goals, and expectations from the customized Moodle platform.

- **Customization Planning:** Create a comprehensive plan outlining the scope, timeline, and resource requirements for the customization project.
- **System Analysis:** Evaluate the existing Moodle instance to identify the areas that need customization and assess the technical feasibility of the requested features.
- **Custom Development:** Implement the required customizations in line with the technical requirements mentioned above. This includes developing new Moodle plugins, modifying existing modules, and integrating third-party tools.
- **User Interface (UI) Design:** Customize the Moodle theme to match the ZEP-RE's branding and ensure a user-friendly interface.
- **Testing and Quality Assurance:** Thoroughly test the customized features to identify and resolve any bugs or issues. Conduct user acceptance testing (UAT) with stakeholders.
- **Deployment and Integration:** Deploy the customized Moodle platform on the ZEP-RE's servers, ensuring seamless integration with the existing IT infrastructure.
- **Training and Documentation:** Provide training sessions to administrators, instructors, and learners on using the new features. Create comprehensive documentation for reference.

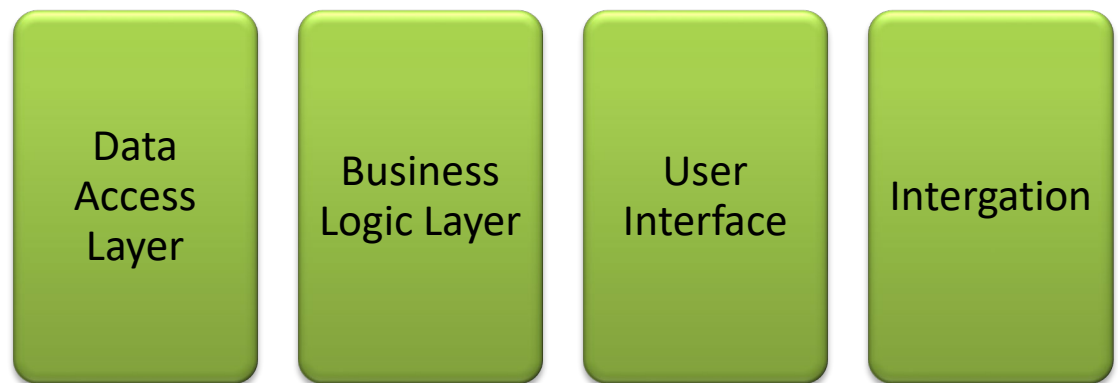
- Ongoing Support: Offer post-implementation support to address any issues or concerns that may arise after the project's completion.
- Project Management: Assign a dedicated project manager to oversee the customization project, ensuring timely delivery and effective communication between the consultant/firm and ZEP-RE.
- Security and Privacy: Implement security best practices to safeguard user data and ensure compliance with relevant data protection regulations.
- Scalability and Performance: Optimize the customized Moodle platform for scalability and performance to handle a growing number of users and courses.

2.3. Architectural Requirements to be met by the Learning Management System

2.3.1. The System MUST be supplied and configured to implement the following architecture.

2.3.1.1. Data Architecture:

The architecture is designed to make the system flexible, scalable, and secure, so the data is stored in an organized way, it can be accessed quickly and easily, and the system can handle many users and large amounts of data.



This is a general overview of the data architecture of an LMS, and the specifics may vary depending on the system and its features.

2.3.1 Hardware Architecture: The purchaser will provide hardware in a cloud service to run the application. It will need to be accessible via public internet.

2.4. Systems Administration and Management Functions Required to be met by the Learning Management System

2.4.1. The System MUST provide for the following management, administration, and security features at the overall System level in an integrated fashion.

2.4.1.1. Installation, Configuration and Change Management:

- The system should be available on web browser.

2.4.1.2. User Administration and Access Control; User and Usage Monitoring and Audit Trails:

- The access to the system features should be role based
- The system should allow dynamic creation of user groups that can be assigned specific system privileges

- The system should allow dynamic creation of organization types that can be assigned specific subset of system privileges
- The system privileges should be tied to the system features with the ability distinguish between; write, read, update and delete rights
- The user group and associated system privileges should be configurable by the super system administrator and respective organizational administrators based on the subset of privileges assigned to their organization type.
- Access needs should be based on unique usernames and passwords for the user based on the user groups they are assigned
- The system should allow delegation of authorization and rights
- The system should provide an audit trail and login attempts to unauthorized access and unauthorized information level
- The system should log all activities on transactions performed based on authorized user access
- The system should provide the alerts to the system administrator by e-mail and by any exception monitoring tools in the events of abnormal system behaviors
- The system should support multi-factor authentication
- Ability to do single sign on using single sign off tool such as Microsoft, Google

2.4.1.3. System and Information Security and Security Policies:

- The system should allow definition of information security levels
- The system should allow definition of user levels which will be tied to specific information security levels
- The access to system information should be user levels based
- Encryption at storage and on transit should be implemented based on information security levels
- The system should have configurable password policies

2.4.1.4. Back-up and Disaster-Recovery:

- Well installed servers for disaster recovery site will be provided by the purchaser
- A fail-over mechanism should be implemented to migrate all the required services from the primary server to the backup server, based on business define RTO and RPO

2.5. Performance Requirements of the Information System

2.5.1. The Information System MUST reach the following performance levels.

2.5.1.1. Volume

- The ability to support 30,000 students per year. (Agents ..., trainers....., Pastoralists)
- They should also be volume insensitive and should be able to scale up as needed

2.5.1.2. Potential Growth

- The expected growth volume should support as much as 100% per year over the next 3 years.

2.5.1.3. Exception Handling

- Exceptions that arise should trigger an email notification to the system administrator as well as to exception monitoring tools and captured on a report to act as a guide in resolving them.

2.5.1.4. Usability

- The system should meet current usability trends as well as information security requirements.

2.5.1.5. System Availability

- The system should be available 24 hours, throughout 7 days of the week or configurable time week.

2.6. General Technical Requirements

2.6.1. Language Support: All information technologies must provide support for the *either national or business language(s) of the end-user(s)*. Specifically, all display technologies and software must support the following languages as a minimum:

- English
- French
- Amharic
- Somali
- Portuguese
- Swahili
- Arabic

2.6.2. Electrical Power: All active (powered) equipment must operate on: *Not applicable*

2.6.3. Environmental: Not applicable

2.6.4. Safety: Not applicable

3. SERVICE SPECIFICATIONS – SUPPLY & INSTALL ITEMS

3.1. System Analysis, Design and Customization/Development

3.1.1. The Supplier MUST perform the following Analysis and Design activities using a formal system analysis/development methodology with the following key activities and design deliverables.

3.1.1.1. Detailed Analysis: *Process Design Document; Software/System Test Descriptions; Software/System Test Plan*

3.1.1.2. Physical Design: *Interface Design Document*

3.1.1.3. Integrated System: *User's Manual; Operations Manual*

3.2. Software Customization / Development

3.2.1. The Supplier MUST perform Software Customization / Development using a formal software development methodology with the following characteristics and/or with the following technologies and/or tools.

3.2.1.1. The supplier is free to choose any methodology that supports agile delivery.

3.3. System Integration (to other existing systems)

3.3.1. The Supplier MUST perform the following Integration Services:

- Configurable integrations to project systems

3.4. Training and Training Materials

3.4.1. The Supplier MUST provide the following Training Services and Materials.

- 3.4.1.1. User: *minimum curricula, modes of training, modes of testing, and training materials for: the introduction to computers, the operation of the relevant equipment incorporated in the System, as well as the operation of the Software applications incorporated in the System;*
- 3.4.1.2. Technical: *minimum curricula, modes of training, modes of testing (e.g., certification levels), training materials and training locations for: the key technology and methodology components of the Information System;*
- 3.4.1.3. Management: *minimum curricula, modes of training, modes of testing, training materials and training locations for: the familiarization with the functionality, technology and methodology components of the Information System, corporate management of information systems;*

3.5. Data Conversion and Migration

3.5.1. The Supplier MUST provide services and tools to perform the following Data Conversion and Migration Services:

- Bulk upload of data, to enable import from historical system and aggregator databases.

3.6. Documentation Requirements

3.6.1. The Supplier MUST prepare and provide the following documentation.

3.6.1.1. End-User documents:

- The supplier should provide handbooks, administration guides, user operation schedules, video demos

3.6.1.2. Technical documents:

- The supplier should provide system custodian operation schedules

3.6.2. The document format should include:

- Detailed documentation of the modules.
- Graphical representation or screen capture of input forms, messages and reports
- On line help documentation accessible from the system through a clickable menu item or icon

3.7. Requirements of the Supplier's Technical Team

3.7.1. The Supplier MUST maintain a technical team of the following roles and skill levels during the Supply and Installation Activities under the Contract:

3.7.1.1. Project Team Leader: *supplier to determine*

3.7.1.2. Business Analyst: *supplier to determine*

3.7.1.3. System Analyst: *supplier to determine*

3.7.1.4. Database Expert: *supplier to determine*

3.7.1.5. Programming Expert: *supplier to determine*

3.7.1.6. System Administration / Security Expert: *supplier to determine*

3.7.1.7. Computer Hardware Expert: *supplier to determine*

3.7.1.8. Network and Communications Expert: *supplier to determine*

3.7.1.9. Training Expert: *supplier to determine*

3.7.1.10. Documentation Specialist: *supplier to determine*

3.8. Telecommunications Services (Supplier-provided)

3.8.1. The Supplier MUST provide the following Telecommunications Services: Not applicable.

4. TESTING AND QUALITY ASSURANCE REQUIREMENTS

4.1. Inspections

4.1.1. Factory Inspections: *Not applicable*

4.1.2. Inspections following delivery: *Not applicable*

4.2. Pre-commissioning Tests

In addition to the Supplier's standard check-out and set-up tests, the Supplier (with the assistance of the Purchaser) must perform the following tests on the System and its Subsystems before Installation will be deemed to have occurred and the Purchaser will issue the Installation Certificate(s)

4.2.1. System Setup

Tests	Test summary
Super admin access	A super admin with credentials can access the web portal admin page
User group creation	Create Group that accepts permissions Available permissions based on all functions
User creation	Create the user Add the user to a group User logs in the system Positive and negative permission test
Organization creation	Create a new Entity Configure entity permissions
Web access	Users Can access via web browser
Process approvals	Test maker checker functionality
Data imports	Upload data in bulk
Data exports	Export data in bulk
Multi tenancy	The system instruction language can change based on configuration

	The system transactional currency can change based on configuration
	The system locations can change based on configuration

4.2.2.

Test	Test Summary
Functional Testing	All features and functions of LMS tested
Usability Testing	Ease of use and friendliness
Security testing	Protection against unauthorized access

4.2.3. Reports

Test	Test Summary
Data analytics reports	Dashboard Metric monitoring reports

4.3. Operational Acceptance Tests

The Purchaser (with the assistance of the Supplier) will perform the following tests on the System and its Subsystems following Installation to determine whether the System and the Subsystems meet all the requirements mandated for Operational Acceptance.

Test	Test Summary
Create	Adding required data for all the functional modules
View	All relevant fields are viewable based on function
Edit	All relevant fields are editable based on function
Delete/Archive	All relevant fields can be archived based on function
Database response time	Quick pull and push requests
Integration	Test integration with PowerBi

5. SERVICE SPECIFICATIONS – RECURRENT COST ITEMS

5.1. Warranty Defect Repair

5.1.1. The Supplier MUST provide the following services under the Contract or, as appropriate under separate contracts (as specified in the RFP documents).

- An administrative task for periodic update shall be provided to allow for fixing of patches and upgrades of the software.

5.1.1.1. Warranty Defect Repair Service:

- *coverage period – 6 months*
- *response time – 4 hours*
- *problem-resolution performance standards – 2 business days*
- *modes of service – Online support and telephone*

5.2. Technical Support

5.2.1. The Supplier MUST provide the following services under the Contract or, as appropriate under separate contracts (as specified in the RFP documents).

5.2.1.1. User support / hot line: *purchaser provided*

5.2.1.2. Technical Assistance: *Supplier to provide in line with SLA below*

5.2.1.3. Post-Warranty Maintenance Services: *This will be subject to a separate contract.*

5.2.1.4. Service Level Agreement: A detailed service level agreement shall specify the priority levels (low, medium and high), response time based on priorities and order of support escalation

Priority	Description	Response Time	Resolution Time
High	Critical system is down. Functions not usable. No workaround or alternative is available. Data is corrupted. Many end users are affected. Regulatory/legal deadlines will be missed.	15 Minutes	4 Hours
Medium	Some functions are usable with severe restrictions. No workaround or alternative is available. Several end users affected.	1 Hour	8 Hours
Normal	Basic functions are usable with minor restrictions. Workaround or alternative is available. One or more users affected.	1 Hour	3 Days
Low	Minor problem. Functions are usable. Defect is cosmetic or simply a nuisance.	Next Business Day	5 Days

5.3. Requirements of the Supplier's Technical Team

5.3.1. The Supplier MUST provide a technical team to cover the Purchaser's anticipated Post-Operational Acceptance Technical Assistance Activities Requirements (e.g., modification of the Information System to

comply with changing legislation and regulations) with the roles and skill levels that are specified below. The minimum expected quantities of inputs by the Supplier's technical support team are specified in the relevant System Inventory Tables for Recurrent Cost Items.

5.3.1.1. System Analyst: *Supplier to determine*

5.3.1.2. Database Expert: *Supplier to determine*

5.3.1.3. Programming Expert: *Supplier to determine*