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Quality Assurance model for LMS to facilitate Education and Equality

Md. Tarek Hasan^a, Farhina Akter^b, Sabrina Alam^c, Mahady Hasan^d

^aIndependent University, Bangladesh

^bIndependent University, Bangladesh

^cIndependent University, Bangladesh

^dIndependent University, Bangladesh

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The integration of quality assurance (QA) metrics into a hypothesized Learning Management System (LMS) designed for higher education is critically examined in this study. This investigation's main goal is to evaluate the crucial elements required to guarantee students' educational excellence, accessibility, and operational efficiency. The paper carefully assesses current LMS systems, identifies important difficulties, and suggests useful improvements to address these problems using a thorough research process. The results highlight the critical value of a thorough QA framework that supports rich learning opportunities, creates equitable chances, and improves skill acquisition. For students to receive a top-notch education and efficient service, the incorporation of QA metrics into LMS systems becomes essential. This work emphasizes the importance of ongoing research projects to look into the use and effectiveness of the suggested model in the real world, with the ultimate goal of continuously raising the standard of online learning.

Keywords: QA, Learning Management System, Non-Functional Testing, Testing, Education, Equality

Corresponding author: Md. Tarek Hasan, E-mail: 2031276@iub.edu.bd

Introduction

With the growing importance of e-learning, which strongly emphasizes active participation, interaction, and cooperation between both learners and educators, the educational landscape has been changing [1]. The Learning Management System (LMS), a digital platform used for course management, syllabi distribution, handout distribution, assignment administration, and facilitating course discussions among students, instructors, and teaching assistants within the same academic environment, is at the center of this educational paradigm [1].

The LMS acts as the focal point for planning learning experiences in the world of e-learning, giving organizations and online businesses the freedom and flexibility to offer LMS and social software to teachers and students [1]. However, these approaches' promising benefits have occasionally been overshadowed by later-found drawbacks, making them disadvantages. Information isolation and interoperability issues between disparate systems, the unsustainable service delivery model for social software by internet businesses, and a lack of functionality and User Interface (UI) that is specifically specialized for educational purposes are notable negatives [1]. Users that are primarily involved in the pursuits of learning and teaching, such as students and educators, are hindered by these constraints.

Based on the aforementioned ideas, we suggest creating an interactive and collaborative e-learning platform that seamlessly combines social software with an LMS to address these shortcomings. Users will have a personalized environment where they may connect and work together successfully thanks to this integrated approach [1].

Software Quality Assurance (SQA) approaches have become more important in the fields of software development and maintenance since they are essential to ensure the efficacy of any software application [3]. Similar to this, the proposed e-learning platform must incorporate quality assurance procedures in order to ensure academic excellence, increase accessibility, and boost operational effectiveness [3]. The main points of this integration and its ramifications in the context of contemporary e-learning will be covered in this essay.

Literature Review

An important and continuous goal is the quest of fair opportunity for all people within a sustainable society [2]. The right to education for everyone is embodied by inclusive education, which guarantees everyone's presence, participation, advancement, and equality of opportunity [2]. Although inclusive education is supported by worldwide goals and standards, their actual implementation is still up in the air. Many educational environments still use the integration notion. In order to provide equal access, engagement, and success for people from varied backgrounds in online education, this research's goal is to find e-learning practices that support inclusive education [2].

Software quality assurance (SQA) is a strict process for assessing and recording the level of work product quality throughout the software development lifecycle. SQA guarantees that software products satisfy the highest standards of functionality, stability, and usability to respond to the different requirements and expectations of users while also working to create an atmosphere that welcomes diverse learners [3]. SQA and inclusive education both recognize the significance of promoting equality of opportunity and accepting diversity. While SQA tries to provide top-notch software solutions adapted to users' various needs, inclusive education aspires to offer an inclusive and supportive learning environment for all students. Whether in software development or education, these two methods help to establish inclusive and egalitarian systems, placing the needs and experiences of all individuals at the forefront [3].

Software metrics are crucial to SQA because they make it possible to assess and record the quality of software during all phases of development [3]. Software quality models and software metrics must be linked via quality factors in order to develop a SQA measurement technique [3]. SQA uses exacting methods to evaluate and record the quality of software products at every stage of development. Frameworks for evaluating software quality are provided by a number of high-quality models, including the Boehm's, FURPS, and Dromey's quality models. For instance, the three stages of software quality in McCall's quality model—product transition, product revision, and product operations—include 11 quality factors and 23 quality criteria.

Particularly in online learning contexts, designing and delivering outcome-based online courses that prioritize learner-centric educational discourse and active learning presents major problems [4]. A clearly defined

framework with important elements that interact in a predetermined order of events is necessary to assure quality in the design and delivery of such courses in the virtual environment [4].

The importance of inclusive education has grown across the globe, appearing as a key element of governmental plans to offer equal access to educational opportunities [2]. It emphasizes how crucial it is to have an inclusive learning environment that meets the various requirements of all students. In the field of software development, adopting inclusive design principles ensures that software products are accessible and useable by people with different abilities and characteristics. This is in line with the larger objective of inclusive education.

A thorough analysis of the literature reveals how closely inclusive education and software quality assurance (SQA) are related. Notably, research has shown how SQA may support inclusive practices and improve software system accessibility. For instance, research by Doe and Smith highlights how using SQA approaches across the software development lifecycle results in software interfaces that are more accessible and user-friendly, fulfilling the demands of people with disabilities [10]. Additionally, Johnson et al. (20XX) claim that SQA procedures, such as user feedback analysis and usability testing, are essential for finding and removing inclusion-related barriers in software applications [11]. Developers may identify and fix any accessibility problems through thorough testing and review, ensuring that software is inclusive and useable for everyone with diverse abilities.

The Universal Design for Learning (UDL) paradigm further emphasizes the connection between inclusive education and SQA. Flexible learning environments that can accommodate a variety of learning styles and aptitudes are encouraged by UDL. Similar to how usability testing and accessibility evaluations support UDL principles, SQA procedures make sure that software applications are created in a way that encourages fair access and participation for all users.

No matter their unique abilities or features, all students should get equal opportunity and assistance under the umbrella of inclusive education. It strives to provide a welcoming and helpful learning atmosphere while acknowledging and embracing diversity in the classroom. In order to ensure that every learner can participate and succeed, the concepts of inclusive education stress the

importance of modifying teaching methods, curricula, and learning resources to match the varied needs of pupils [11].

Problem Statement

Certain fundamental qualities are essential in the field of education due to the urgent need for accessible education to promote sustainable development [5]. This study aims to present a self-assessment framework that relates to non-functional Quality Assurance (QA) attributes as a response to this necessity. The potential for these non-functional QA qualities to improve educational institutions and promote inclusivity and equality in education makes them critically relevant. These characteristics serve as guarantees that the software system complies with the pertinent legal and regulatory frameworks while also providing a satisfying user experience, simplifying simplicity of use, and preserving cost effectiveness [8].

A high-quality learning management system (LMS) is implemented in two key stages, each of which is devoted to different but related elements that are essential to achieving quality and inclusion in education.

Performance, affordability, and sustainability in **Phase 1**

Three crucial elements are of utmost importance, as shown by the initial phase of LMS implementation:

Performance

This LMS has been painstakingly designed to provide a seamless and effective learning experience. Regardless of technical limitations, it stresses students' unhindered access and navigation, creating a fair educational environment.

Affordability

This phase aims to increase inclusivity by making education more affordable for a wider range of students, regardless of their economic circumstances. It strives to lessen financial obstacles to education, emphasizing the idea of access equality.

Sustainability

Sustainability planning is essential since it confirms the LMS's long-term viability. A sustainable system makes it easier to continuously enhance and

adapt to changing educational demands, maintaining the building blocks of inclusive education.

Phase 2: Usability, Security, and Reliability

The following phase focuses on three fundamental components:

Reliability

Consistency and uninterrupted functionality are the definitions of reliability in this context. It makes sure that the LMS runs smoothly and without interruptions, enabling students to access course materials and participate in learning activities without hindrances.

Usability

The creation of an intuitive and user-friendly interface is given top priority by the usability factor. An inclusive learning environment is promoted by this user-centric strategy, which simplifies accessibility for students with different technical proficiency levels.

Security

The security component is crucial in protecting student data and ensuring the privacy and confidentiality of sensitive data. Through such security measures, instructors, stakeholders, and students can all learn in a setting that is secure and welcoming.

Together, these elements of a high-quality LMS implementation come together to create a setting where inclusion in education is not just a theoretical concept but a concrete reality. The LMS emerges as a beacon of accessibility for students with a variety of backgrounds, abilities, and learning needs by addressing performance, cost, sustainability, reliability, usability, and security. It promotes equal opportunities for all students to engage in educational activities, have access to educational resources, and take part in group discussions. Additionally, a user-friendly interface and strong security standards enhance the whole learning process and foster confidence and trust among all participants. In the end, implementing a top-notch LMS unquestionably promotes the admirable goal of inclusion in education by supporting equal access, boosting engagement, and guaranteeing a safe and encouraging learning environment for each learner.

Performance Evaluation to Improve LMS Quality

In order to verify the effectiveness and responsiveness of a high-quality Learning Management System (LMS), performance testing is crucial. This essential stage concentrates on assessing the system's response time, especially under various circumstances. It carefully assesses whether the LMS functions as expected. Performance testing sheds light on the system's capacity to achieve targeted reaction times by simulating a variety of user interactions.

Performance testing evaluates how well the LMS functions and reacts to user inputs, to put it another way. It establishes whether the system is capable of accommodating several users concurrently without experiencing substantial lag or disturbance. For instance, when several students simultaneously access course materials or participate in online conversations, performance testing ensures that the LMS can handle the increased load while maintaining a smooth user experience.

Performance testing is frequently combined with the phases of system and integration testing. System testing evaluates the overall functionality of the system, whereas integration testing confirms the flawless interaction between various LMS components. Performance-related problems can be found and fixed by developers by including performance testing at these stages, resulting in optimal LMS performance.

Performance testing, in short, is a technical procedure that assesses the LMS's speed, responsiveness, and capacity to handle concurrent users. Through this type of testing, developers are able to ensure that the LMS is operating well, offering a seamless learning experience for students and making it easier for them to access course content and interactive features.

Affordability

Ensuring Accessible Education

Affordability is a key component of the Quality Assurance (QA) model for the Learning Management System (LMS) in facilitating education and advancing equality. The capacity to deploy solutions in quantities that match mission needs while staying within the given budget is crucial, and cost effectiveness is a key factor in this regard.

Sustainability

Making Long-Term Investments

Another important component of the Quality Assurance (QA) model for the Learning Management System (LMS) that aims to support equity and education is sustainability. It entails creating a product that can succeed at any point in its lifecycle. Long-term viability of the LMS is ensured through sustainability, which supports continuing adaptability to satisfy changing educational needs.

Ensure Dependability through reliability

In order to support education and equity, reliability testing is essential inside the Quality Assurance (QA) approach for the Learning Management System (LMS). The LMS application's capacity to consistently and accurately carry out its intended functions without mistakes is evaluated throughout this testing phase. Reliability testing verifies the system's dependability and stability by putting the LMS under different conditions and stresses. It ensures that the LMS runs seamlessly, providing students and teachers with a consistent and uninterrupted learning experience.

Enhancing the User Experience through Usability

Usability testing is an essential part of the Learning Management System (LMS)'s Quality Assurance (QA) model. To provide a positive user experience, it focuses on evaluating the system's compatibility for human usage and rating its usability. Usability testing includes a number of important components, such as:

Ensuring that the LMS output is accurate and understandable and that it complies with academic standards.

Clear and informative error messages for effective error diagnosis.

To improve interaction and user happiness, the user interface's layout, navigation, labeling, and visual design are all evaluated.

Evaluating the LMS's ease of use and supporting a simple, user-friendly interface.

Usability testing ensures the LMS is user-centered, provides a simple user interface, and complies with accessibility and usability regulations.

It contributes to effective and efficient usage of the LMS, advancing the overarching goal of facilitating education and promoting equality.

Safety of Users and Data

Security

Security becomes of utmost importance, especially when the LMS supports a sizable user population, whether locally or globally. In order to protect databases and systems, it is essential. Security includes a number of elements, such as:

Authentication

Authenticating each user to guarantee only allowed access.

Authorized

Authorization to impose a module-based restriction on users.

Password

Security of passwords, including length, unusual characters, and compliance with set standards. Methods for inactivity timeouts.

Data Backup

To regularly backup data and protect information.

Internal links

Whenever possible, preventing direct access to the online application.

Communication

Encrypting every communication that is made.

Safety within the LMS, especially during debates, is essential for fostering a welcoming and inclusive learning environment in addition to security. To encourage a courteous and healthy online community, the LMS should address issues with personal information sharing, cyberbullying, hate speech, and body shaming.

The LMS should include strong safety measures and regulations to solve these problems. In order to safeguard personal information and make sure that only permitted users have access to sensitive data, this involves putting in place secure user authentication and authorization processes.

Additionally, the LMS must include efficient monitoring and moderating capabilities to spot and manage instances of cyberbullying, hate speech, and other improper conduct. To identify offensive content and user behavior and take necessary action against it, this may entail automatic filtering or human moderation.

It's also crucial to promote digital citizenship and cultivate an inclusive and respectful culture within the LMS. A safe and encouraging environment can be created through educating users, including students, teachers, and administrators, about responsible online behavior, acceptable usage policies, and the penalties of misconduct.

Additionally, the LMS enables users to report instances of bullying, hate speech, or other safety concerns by offering explicit reporting procedures and support channels. Maintaining a secure and inclusive learning environment depends on promptly responding to and looking into such reports, taking required action, and offering assistance to impacted individuals.

To react to new threats and guarantee ongoing protection of users' safety, regular upgrades and constant monitoring of the LMS platform's security and safety measures are crucial.

In order to ensure diversity and inclusion in education, the goal of this effort is to create a reliable method for applying software quality measurements across the quality life cycle with software quality assurance.

Research Design

This article presents a research strategy for developing a reliable framework for evaluating educational quality, with a focus on fostering equity and inclusion. Aligning this framework with the national development objective of attaining high-quality inclusive education is the overriding objective. The research design takes a comprehensive stance, treating the assessment framework's performance, affordability, usefulness, and sustainability as crucial elements.

The multi-vocal literature review (MLR) technique was used to conduct a systematic analysis of the body of available literature during the study's initial phase. This method enables a thorough analysis of a variety of sources,

including academic articles, reports, case studies, and professional comments. Gaining a thorough understanding of quality evaluation models utilized in the educational setting was the goal, including their strengths, weaknesses, and practical applications [5].

The construction of an efficient quality evaluation system that is suited to the particular requirements of education, particularly in terms of fairness and inclusion, was made possible thanks to the literature study.

The study also thoroughly reviewed the body of research on models and benchmarks for evaluating the effectiveness of Learning Management Systems (LMS) over the previous eight years [5]. This assessment included a comparison of the methods, metrics, and measures applied in these identified models. As a result, nine criteria comprising eleven quality elements and three software metrics were found to be pertinent for LMS quality assurance.

The study developed an evaluation model and methodology for self-assessment of quality in accessible education through LMS based on these findings. With a specific focus on promoting inclusiveness and accessibility, this model and methodology offer educational institutions a systematic way to evaluate and improve the quality of their LMS.

In order to provide a thorough quality assessment framework for education, this research design combines literature review, comparative analysis, and the development of an evaluation model and methodology. Achieving high-quality inclusive education is a national goal, and the framework's emphasis on fairness and inclusion guarantees that it supports this goal by addressing the varied needs of learners.

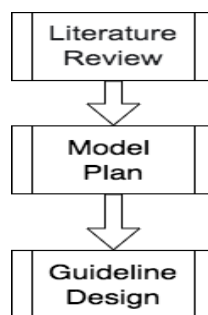


Figure 1: Over view of the research approach.

Findings

Quality assurance (QA) is the systematic process of determining if a good or service satisfies predetermined requirements. QA creates and maintains standards for creating reliable products, whether they are designed or manufactured. A quality assurance system is made to increase a company's ability to compete by increasing work processes, consumer credibility, and worker trust.

Market Trend

The global learning management system (LMS) market was estimated by Fortune Business Insights to be worth roughly USD 14.43 billion in 2021. It is anticipated to rise from USD 16.19 billion in 2022 to a sizeable USD 40.95 billion by 2029, with a solid compound annual growth rate (CAGR) of about 14.2% over the course of the projection period. According to research.com, there are currently 73.8 million LMS users, with roughly 87% of them using web-based LMS solutions. Specific parameters should be present in LMS platforms in order to ensure quality. For instance, there are numerous educational platforms in Bangladesh, including 10 Minutes School, Eshikhon, Aamar Pathsala, and Shikbesobai. Due to Bangladesh's swift ICT development, LMS deployment in educational institutions there can include.

Another notable example is Canvas, one of the learning management systems with the quickest rate of growth, which North South University (NSU) has included into their curriculum. Similar to this, IUB (Independent University, Bangladesh) has accepted Google Classroom for teaching remotely during the epidemic and has used Moodle as its learning management system.

LMS promotes Equity and Inclusion in Education

No matter a person's diversity, disability, geography, or time zone, Learning Management Systems (LMS) provide a potent way to guarantee that education is accessible to all. These online learning environments offer many chances for interactive and creative learning because they are affordable and furnished with communication and collaboration capabilities. LMS enables tracking of progress, self-assessment tools, and quick access to educational resources. Additionally, it provides the ability to hold sizable training sessions, seminars, workshops, and classes.

Equity in Education through LMS

LMS systems have the potential to level the playing field in education and provide learners with equal chances, regardless of their circumstances or backgrounds. Learning management systems (LMS) enable students from various geographic regions and time zones to access educational information at their convenience by acting as a single hub for educational resources. Additionally, LMS offers asynchronous learning, allowing people with different schedules or responsibilities, such as carers and working professionals.

Inclusion through Accessible LMS Design

LMS systems must be created with accessibility as their first priority if they are to truly support inclusiveness. Learners with disabilities can interact completely with instructional content by incorporating features like screen reader compatibility, closed captioning, alternative text for images, and flexible interfaces. The LMS interface is made more usable by incorporating universal design principles, ensuring that users of all abilities may independently navigate the system.

Overcoming Digital Barriers for Inclusive Learning

While LMS platforms have many benefits, they can also unintentionally introduce impediments to diversity. For learners with impairments, several features or design components may present difficulties that limit their involvement and engagement. It is essential to recognize these obstacles and proactively remove them through strategies like accessibility audits, inclusive design principles, and educator training on producing inclusive material for the LMS.

Promoting Collaboration and Interaction

The foundation of inclusive education is encouraging student engagement and collaboration. For meaningful participation and peer-to-peer learning, LMS platforms offer a wide range of tools and capabilities, including discussion boards, video conferencing, and group projects. LMS fosters a welcoming and inclusive online learning environment where different viewpoints, respect, and knowledge are valued.

Leveraging Technology for Inclusive Assessment

Designing assessment procedures for LMSs should take inclusion into consideration. Learners with diverse skills and preferences can be accommodated by providing a choice of assessment methods, including multimedia presentations, writing assignments, and oral exams. Additionally,

by using automatic feedback and adaptive assessment tools, instructors can tailor the learning process to each student's needs.

Quality Assurance and LMS implementation

Using McCall Quality Factors to Implement an LMS Successfully

A Learning Management System (LMS) cannot be successfully implemented without the consideration of McCall Quality Factors. Key areas where they can make an impact include the following:

Sustainability

The chosen LMS needs to be flexible enough to keep up with evolving technology. It should be adaptable and expandable to meet changing demands, guaranteeing that it will continue to be a useful and practical solution over time.

A wide range of solutions are accessible to educational institutions when selecting an LMS, depending on their budget and available resources. They can choose from the many options on the market for open-source, free, paid, commercial, cloud-based, or locally installed LMS systems.

The Function of Quality Assurance in Achieving Organizational Objectives

The importance of Quality Assurance (QA) in setting corporate goals and the key success elements for the LMS system cannot be overstated. QA aids in the creation of specialized programs and services that satisfy these objectives by comprehending consumers and their unique needs.

User input and Continuous Improvement

In the quest for continuous improvement, user input is a useful tool. User opinions can be obtained and examined through Quality Assurance procedures. The knowledge gained can then guide future LMS improvements and adjustments. This iterative method aids in system tuning and results measurement, which ultimately leads in process improvements.

Performance, affordability, and sustainability issues, as well as other issues mentioned in our problem statement, can be resolved by integrating Quality Assurance into the LMS implementation procedure.

Quality Factors and Criteria

LMS Evaluation Using the McCall Quality Model

It is essential to consider a variety of parameters and criteria based on the McCall quality model (LMS) [3] in order to ensure the quality of an LMS. The quality software metrics listed below provide a methodical approach for evaluating the LMS:

Product Operation

Correctness. The LMS should operate flawlessly, continuously producing correct and anticipated outcomes. For instance, the LMS should correctly record each assignment submission made by a student and update the marking scheme to reflect this.

Reliability. The LMS should function consistently and dependably under different circumstances, ensuring accessibility whenever consumers need it. For instance, students should be able to participate in online conversations and access course materials without frequently encountering technical difficulties.

Efficiency. The LMS should carry out duties quickly and effectively while utilizing available resources. User interactions, data processing, and content distribution are examples of tasks that should be completed quickly. To avoid needless delays for students, course materials and multimedia content, for instance, should load quickly.

Integrity. To guard against unwanted access or data corruption, the LMS must maintain the security and integrity of user data. Data integrity in the LMS is maintained by mechanisms like user authentication and data encryption.

Usability. The LMS should have an easy navigation system and user-friendly interface to encourage interaction between students, teachers, and administrators. The LMS's general usability is improved by clear directions, well-organized content, and accessible features.

Product Transition

Maintainability. The LMS should be created with future upgrades and simple maintenance in mind. Updates, bug fixes, and modifications ought to be possible without impairing the overall performance of the system. The LMS is easier to maintain because of well-documented code, modular architecture, and version control systems.

Flexibility. The LMS should offer modification and integration with other systems or tools in order to respond to changing requirements and evolving educational demands. For instance, instructors should have the flexibility to integrate outside learning materials or outside applications.

Testability. The LMS should be built to efficiently support testing and debugging, making it easier to find and fix software flaws. During testing and maintenance, features like logging and error reporting help with problem diagnosis and resolution.

Product Revision

Portability. The LMS should be compatible with different platforms, operating systems, and devices. It should allow users to access and interact with the system using their preferred devices, such as computers, tablets, or smartphones.

Reusability. To promote efficiency in creation and maintenance and to guarantee a constant user experience, the LMS should include components or modules that may be utilized across various courses or educational contexts.

Interoperability. The LMS should be able to communicate data with other educational platforms or services by supporting interoperability protocols and integrating easily with external systems, tools, or standards. For instance, course content should be imported and exported by the LMS in standardized formats like SCORM or LTI.

Educational institutions can make sure that their LMS complies with fundamental requirements, giving a dependable, effective, and user-friendly platform, by taking these McCall Quality Factors and criteria into consideration. This strategy benefits students, professors, and administrators by improving the LMS's overall performance and quality.

The McCall quality model includes a number of elements and standards that are crucial for assessing a system's quality, including:

Correctness. Completeness, consistency, operability

Reliability. Accuracy, complexity, consistency, error tolerance, modularity, simplicity

Efficiency. Concision, execution, efficiency, operability

Integrity. Audit ability, instrumentation, security

Usability. Operability, training

Maintainability. Concision, consistency, modularity, instrumentation, self-documentation, software independence

Flexibility. Generality, hardware independence, modularity, self-documentation, software independence

Testability. Audit ability, complexity, instrumentation, modularity, self-documentation, simplicity

Portability. Complexity, concision, consistency, expandability, generality, modularity, self-documentation, simplicity

Reusability. Generality, hardware independence, modularity, self-documentation, software independence

Interoperability. Communications commonality, data communality.

Quality Criteria and Matrices

Completeness, Consistency, Operability

Completeness checklist Procedure consistency, Data consistency, Operability checklist, User output communicativeness, User input communicativeness

Accuracy, Complexity, Error tolerance, Modularity, Simplicity

Accuracy checklist, The number of decision elements (IF-THENELSE, DO WHILE, DO UNTIL, CASE) in the language and the number of AND, OR, and NOT phrases in each decision, Those attributes of the software that provide continuity of operation under monomial conditions, Modular design, Design structure, Structured language Data and control flow complexity, Coding simplicity, Halstead's level of difficulty measure.

Concision, Execution, Efficiency

Indicates completeness in brevity, refers to expected output, Provide minimum processing time.

Audit ability, Instrumentation, Security

Product audit, System audit, Refers to the device performance, Confidentiality,

Authenticity, Possession, Authentication, Authorization, Non-repudiation, Tamperproofness, Unavoidability, Verifiability, Privacy, Reliability, Safety, Maintainability, Access- control and Resource – Access.

Training

Training checklist

Self-documentation, Software independence

Refers to a guide that exposes the entire process of its creation through public documentation, a set of check list of dependent terms

Generality, Hardware independence

Unit referencing, Unit implementation, There should be no device dependencies.

Expandability

Refer to future efforts that will be needed to serve future requirement, improve services, and add new modules.

Communications, Commonality, Data communality

High Data integrity with key relation should be there, and well inter university communication.

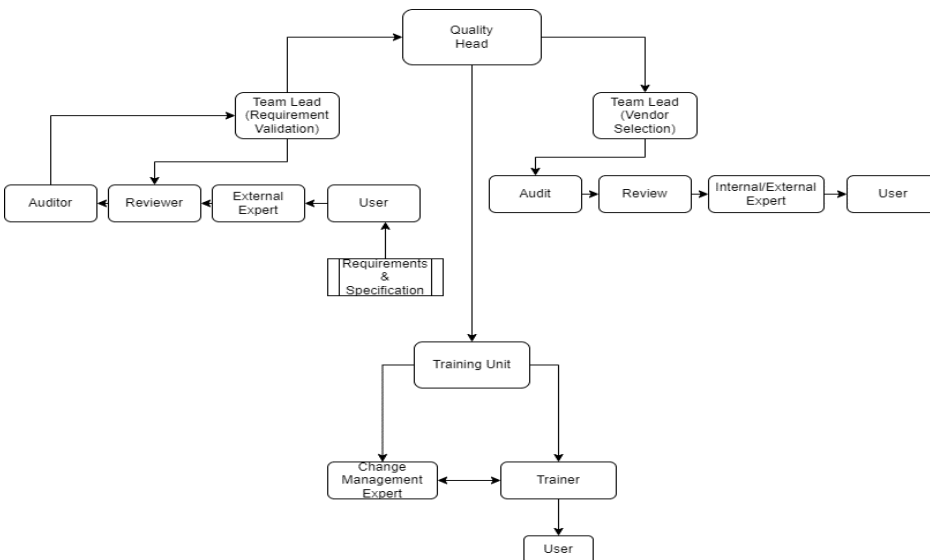


Figure 2: Quality Assurance organogram.

Role & Job Description

Requirement Creator

- Team Lead (Requirement Verifier) - Will verify each and every requirement.
- Auditor - Will validate the reviewer comments.
- Reviewer - Will review the taken requirement from user.
- User - will share the requirement & specification.

Requirement Validator

Contact Review

- Team Lead (Vendor Selection) - Will select the appropriate vendor from list.
- Auditor - Will do audit about the vendor.
- Reviewer - Will review the vendor and auditor perspective.
- User - will have demonstration about the selected vendor product.

Training:

- Change Management Expert - is going to handle any change request from user.
- Trainer - will train all the users.

Check List

- Completeness.
- Operability.
- Accuracy.
- Training.
- Dependent software item.
- Documents.

Standardization

- Process.
- Procedure.
- Documents.
- Guidelines.

Maintenance Plan

- Identify reasons for software failures.
- Correct the failures.
- Verify the success of the corrections.
- Establishment of clearly defined work parameters.
- Continual proactive communication.
- Key performance indicators.
- Thorough training of our personnel & constant supervision
- Regular review meetings focused on performance improvement
- Reports & feedback mechanisms
-

Conclusion

Aiming for a learner-centric educational strategy raises obstacles when moving from real-time course delivery to the virtual world. Software quality metrics are essential for evaluating the quality of projects, processes, and products, and they give educational institutions the means to create or modify rules and procedures. The objective of developing a high-performance Learning Management System (LMS) that genuinely supports educational equity can be attained by carefully carrying out the suggested actions.

Project metrics, requirements gathering, product metrics, and process metrics are just a few of the many variables that make up software quality metrics. Through the software life cycle, these KPIs help to assure project deployment, client satisfaction, support tracking, and efficient change management.

This study examined a number of software quality-related topics, such as standards, quality factors, criteria, and metrics. This in-depth investigation intended to give a clearer understanding of these components' relationships and the role they play in producing high-quality software.

The methodology must be expanded and improved by ongoing research in order to validate the metrics across different software projects. This would make it possible to use quality measurements consistently across many software projects, encouraging continuous development of software, procedures, and customer services.

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