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ACRITICAL REVIEW OF SOFTWARE QUALITY MODELS IN ACADEMIC INFORMATION SYSTEM

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ABSTRACT

In the contemporary educational landscape, the quality of Academic Information Systems (AIS) like E_learning System plays a pivotal role in enhancing the efficiency and effectiveness of educational institutions. This study examines the critical factors that influence the quality of AIS, including system usability, data accuracy, user satisfaction, and the impact on academic performance. Through a comprehensive analysis of existing literature and empirical data, the research highlights the significance of robust AIS in supporting administrative functions, academic processes, and decision-making. The findings underscore the necessity for continuous evaluation and improvement of these systems to ensure they meet the evolving needs of students, faculty, and administrators. Furthermore, the study provides practical recommendations for educational institutions to optimize their AIS, thereby fostering an environment conducive to academic excellence and innovation.
Keywords: *AIS, Software quality, E_learning, Models, Information System, ISO 9126, CMMI*

1. INTRODUCTION

In figure 1, A system is a set of elements joined together to achieve common objectives i.e. group of elements organized with a purpose [1]. The systems often have multiple goals and utilize computer hardware, software, manual procedures, management, decision models and database. A system is consisting of a sub-system, which may be composed of another sub-system, these subsystems Sub-systems connect with each other [2]. describe a system as "a set of interrelated components, Systems have undergone significant transformation over the past fifty years, enabling organizations to achieve common objectives and perform various roles in hierarchy and management operations.

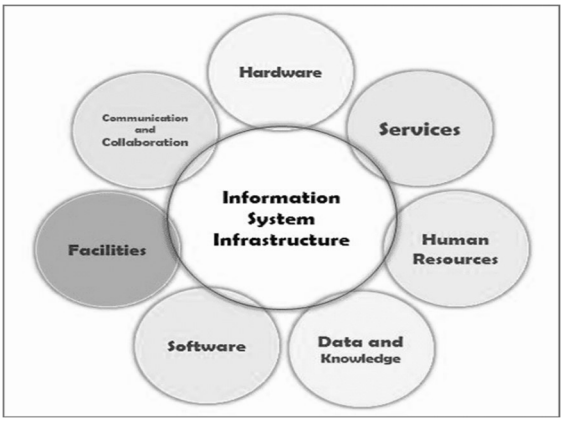

Figure 1: Parts of Information System

also [3]. Software is an essential part of any educational environment. In Academic Information Systems(AIS), software quality models like ISO/IEC 9126 and ISO/IEC 25010 SQuaRE enable the evaluation and improvement of software attributes such as functionality, reliability, usability, efficiency, and portability. However, AIS requires customization and compliance with educational policies [4].

This literature review will focus on the state-of-the-art software quality models and their capabilities, highlighting the gaps and opportunities for improvement. The research tries to reconstruct the frameworks for quality assessment in academia,

identify the defects, and suggest improved methods. It revolves around establishing the need to determine learners to meet dynamic needs and objectives of educational institutions [14].

1.1 A cadmic Information Systems

The universities achievements in the education and in research areas depend on the university systems activity or their Academic Information Systems (AIS) they adopted. Therefore, the Purposes of Information Systems in universities [4] are:

Improvement of the University Management: A computerized process is necessary for an information system, as is the construction of general process components and the integration of other components from distinct process segments. Decision-makers at benefits from such a system by being able To obtain summarized reports of several procedures and make informed decisions [5].

Decreasing of Administration Expense: Universities' information systems streamline operations, lower errors, and enhance control by disseminating final reports to subdivisions, thereby simplifying administrative procedures [4].

Achieve Competitive Advantage of University: The evaluation of university is conduct by its competitive advantage compared with other universities. The advantage that affects university educational and academic production, which was predetermined by alumnae, teachers, researchers, publications, arrangements, quality, [6]. Use the "Insert Citation" button to add citations to this document.

Transparency of Financial and Economic Activities.

The university utilizes information systems to enable visitors and outsiders to evaluate processes and services through its internet-based website [7].

1.2 Integrated University Information Systems

There are several studies and researches discussed the importance of integrated University E-learning systems enable faculty members to conduct classes electronically, especially during the Corona Pandemic, using technology resources like Microsoft Teams software for communication with students [10] see figure 2.

Microsoft teams provide easy tools to conduct virtual classes or virtual lectures, exams, chat and assessments. The Corona Pandemic or covid_19 has made all educational institutions, schools and universities, move towards learning by creating virtual classrooms; to support the continuity education and reduce the risk of transmission of the epidemic between students and [3].

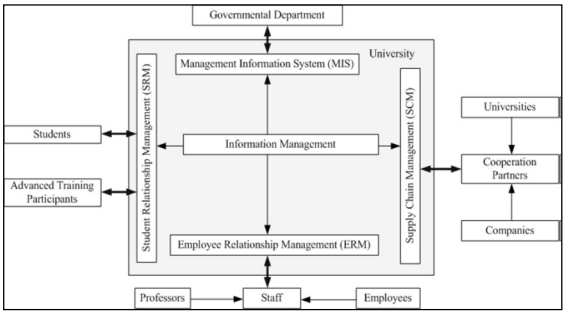

Figure 2: Integrated University Information System {source: [8]}

and integrate all university subsystems into one all-inclusive educational platform, transforming traditional space into an interactive classroom [7].Information Systems, however (Lupu, Bologa, Sabau, & Muntean, 2008) Simplifying administrative procedures by releasing final reports and distributing them to subdivisions, the information system in universities streamlines processes, reduces errors, and improves control [8]. Therefore, the Requirements to an Integrated University Information System list below:

Communication: An integrated IS should facilitate smooth online and offline communication between teaching staff and students, utilizing various communication mechanisms like active announcements, chats, and online access to materials and assignments , [9] and [4].

Service Functionality: Services include the implementation of managerial functions through online registration through software tools embedded in an E-Learning System or through the university page using the registration link.

Content Management and Publishing: The university incorporates a digital library, course material, and university calendar, providing students with essential information resources. The data model is customized to meet individual requirements and system distribution [1].

Information Extraction from Different Data sources: The student timetable demonstrates how information can be generated by linking different systems, such as the E-Learning System, Registration System, and Finance System, allowing only course-enrolled students to access.

Data Security and Privacy: The fundamental issue of security infrastructure is crucial for faculty members, participants, and professors to ensure

secure access to existing systems and personalize content [7].

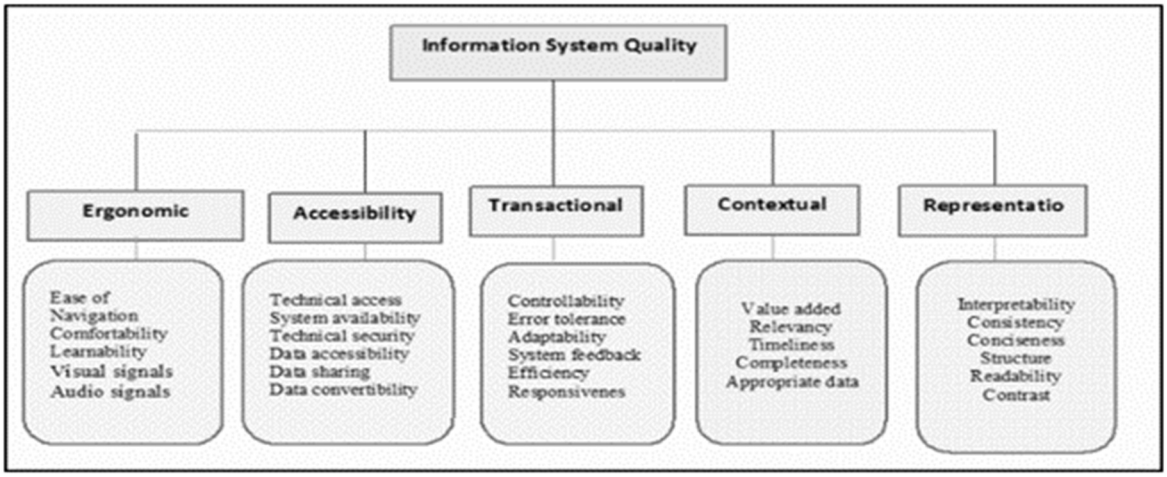

Figure 3: IS quality

1.1 E-Learning as Comprehensive Information System

E-learning systems enable faculty members to conduct classes electronically, especially during the Corona Pandemic, using technology resources like Microsoft Teams software for communication with students [10].

Microsoft teams provide easy tools to conduct virtual classes or virtual lectures, exams, chat and assessments. The Corona Pandemic or covid_19 has made all educational institutions, schools and universities, move towards learning by creating virtual classrooms; to support the continuity education and reduce the risk of transmission of the epidemic between students and [3]. and integrate all university subsystems into one all-inclusive educational platform, transforming traditional space into an interactive classroom [7].

1.4 Quality Issues

The first definition of quality at the beginning of 20th century announced by Shewhart (1924) "*There are two common quality considerations: the quality of the services and the observable features of the products meet a fixed standard, i.e. compliance with predefined qualifications. Output quality must be capable of fulfilling the beliefs of the customer".*

1.4.1 quality of information

E-learning shows how an educational platform can transform conventional space into an interactive classroom, overcoming time constraints and integrating all university subsystems into one comprehensive educational platform, develop a useful framework for the quality of IS, we must identify key components of IS (i.e., data, interface, work design, and software /hardware components).

For simplicity, the quality categories shown in Figure 3, which include the fundamental four quality category of each component. E-learning enables the integration of all university subsystems into a single comprehensive educational platform, transforming conventional spaces into interactive classrooms and overcoming time constraints. expectations and requirements of workers five quality categories were identified in see Figure 4.

1.4.2 quality of academic information systems

ISO/IEC 25010:2011 and ISO/IEC 9126 are widely used standards for assessing the quality of The existing models often emphasize general software attributes and may not adequately address AIS-specific challenges and priorities, such as various quality requirements for software, ensuring a comprehensive and functional system [6].

1.4.3 software quality vs information system quality

The quality of software is significantly influenced by global software development industries, which promote improvement through

organized and holistic quality models., such as Total Quality Management [10]. The literature on TQM and other quality models relevant to software, such as ISO/IEC 9126 -1 and the Capability Maturity Model (CMM).

In this paper, a QIS is defined as ("an organized method of collecting, analyzing, storing and reporting information on quality to assist decision-makers at all levels") [10]. involving Jordan high educational, the quality of software in Jordanian universities' e-learning system is significantly influenced by the quality of the QIS models and frameworks used in software production. This paper aims to evaluate their relevance and applicability in enhancing software quality.

3.1 Software Quality

2. Problem Statement

Software quality models serve as essential frameworks for assessing and improving system attributes, Despite the There is a Lack of harmony in their applicability.

The existing models often emphasize general software attributes and may not adequately address AIS-specific challenges and priorities, such as scalability for growing academic demands, data security for sensitive information, and integration with emerging educational technologies.

This paper attempt to identify what is missing in the prevailing models and gives a recommendation on how to adjust or come up with frameworks suitable for the dynamic needs of the academic sector. Entails critically reviewing the current models and responding to the question of how they fill the gaps by developing or creating other frameworks in line with the dynamic requirements of the academic sector.

3. Pioneer Quality Models

Consisting of quality sub-attributes and characteristics, ensures consistency in the quality of products and services. For instance, three sub-characteristics are referred to in Boehm's Maintainability model as features, see Table different quality models, different terminology are used for output sub-characteristics.

3.2 Quality Metrics

Quality metrics are analyzed using numerical measures, ensuring a comprehensive and

Quality in software is crucial for university production. The quality of software is influenced by the quality of the information system (QIS), and understanding the characteristics of these models can help improve software quality. In Jordanian universities, (e-learning system). High quality software development is an important aspect, as it reduces maintenance costs and ensures efficient software reuse, though different definitions and characteristics exist among developers, students, and stuff [11].

information systems, particularly in electronic various education systems. These standards ensure consistency and precision, addressing issues such as user viewpoint, information security, and profit purpose [12].The standard method for assessing the quality of AIS software production is proposed, considering effectiveness, and adaptability to meet specific demands of academic institutions .

detailed value for each metric to be a cornerstone of a quality model.

Table 1. Names for Quality Sub-Characteristics

Quality Model	Second Layer
Boehem Model	Primitive characteristic
McCall Model	Criteria
ISO Model	Sub-characteristic
IEEE Model	Sub-factor
Dromey Model	Subordinate Attribute

ISO/IEC 9126-1 declared that the quality in use is " The quality view of the user" The achievement of the quality in use depends on the achievement of the external quality of the goods and services, which in turn depends on the achievement of internal quality ". The quality in use is divided into

four features: Efficiency, Productivity, Safety and Satisfaction, See Fig when executed software product

1. **McCall's Quality**

Incorporates eleven requirements for product processes, product revision, and product transformations in McCall's Model (1977) for software consistency. software quality model, which focuses on evaluating software products' quality using a number of important criteria. Three major viewpoints are included in this model, which is also referred to as McCall's quality model, *see* figure 4.

• This model's shortcomings include its lack of attention to a system's functional characteristics.

•The need to weigh features.

•Services using a multiple-point scale rather than a yes/no scale based on numbers. A number of metrics and functions for normalization are described by McCall et al [MCC77].

A working set of quality factors for software is defined as " Correctness, Reliability, Efficiency, Integrity, Usability, Maintainability, Testability, Flexibility, Portability, Reusability and Interoperability "[14].

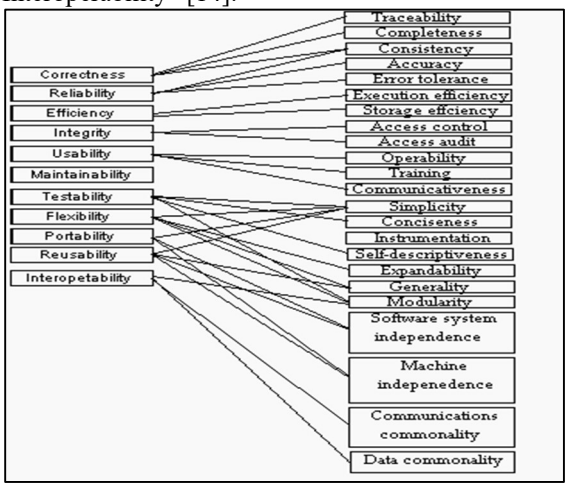

Figure 4: McCall's Quality Model

One of the important aspects of the McCall model is the relationship between quality characteristics and metrics, although it has been criticized that not all measurements are objectives [8].

This model's shortcomings include its lack of attention to a system's functional characteristics and the need to weigh features and services using a multiple-point scale rather than a yes/no scale based on numbers, see fig 6.

2. Boehm Quality Model

In figure 5, model introduced new characteristics to the Boehm model (1978) proposed by Barry W. Boehm. See Figure 2.7 for the Boehm model to try to overcome the gaps of other models that measure software quality quantitatively and automatically [7]. Portability, maintainability, usability, humanity are the elements in this model.

In that it reflects a hierarchical system of attributes, each contributing to overall efficiency, the Boehm model is similar to the McCall model. As McCall does, the Boehm system encapsulates the user's needs; it also adds the hardware performance features not found in the McCall model, however. Software development involves high quality maintenance, reducing costs for reuse and enhancing software quality. Organizations strive to maintain these standards, ensuring that their software remains competitive and reliable.

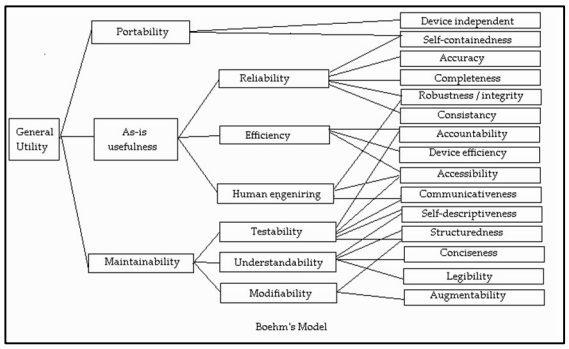

Figure 5: Boehm Quality Model

3. ISO/IEC 9126 Quality Model.

ISO/IEC 9126 outlines the quality of a product as a combination of physical features, external consistency (usability and reliability), and internal characteristics, governing its performance in its environment [13], Nonetheless, a drawback of this model lies in its lack of clarity regarding the methodologies for measuring these aspects. The quality model encompasses layers and levels in ISO/IEC 9126 that are categorized as Characteristics, Sub-characteristics, and Metrics as outlined in figure 7.

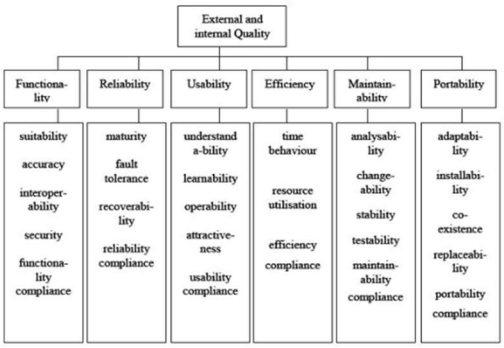

Figure 6: (ISO/IEC 9126-1) Quality Model

The overall structure of ISO9126-1 is similar to the McCall (1977) and Boehm (1978) versions, although there is a major difference, compliance falls under the feature, all features that are defined as Non-Functional requirements in many requirements specifications, not pure functional requirements. The compliance attribute is known to be an ISO9126 functional characteristic.

4. FURPS Quality Model

Robert Grady's FURPS quality model, which focuses on Functionality, Accessibility, Reliability, Performance, and Supportability, lacks portability, a crucial requirement for portable software, see figure 7 below.

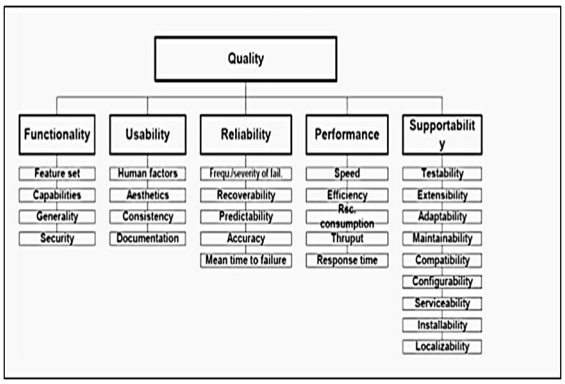

Figure 7: FURPS model

5. Dromey Quality

Figure 8, demonstrate Dromey's Quality Model focuses on the relationship between quality attributes and sub-attributes in software product properties, evaluating Requirement, Design, and Implementation phases.
Quality-influencing commodity properties.

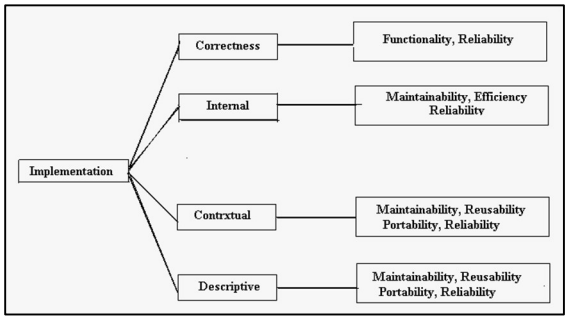

Figure 8: Dromey Quality model

•High-level quality attributes.
•Relating properties with attributes of quality.
The components all have intrinsic properties that can be, according to Dromey (1995), classified into four parts: "Correctness, Internal, Contextual, and Descriptive." [12]. In comparative with ISO/IEC 9126, It is noticed in this model the main feature in the (ISO/IEC 9126) model the "Functionality Maintability, Reliability, and Efficiency "considered in this model as some criteria to evaluate, in addition to reusability as new criteria in this model.

3.3 Comparative Analysis of Most Standard Hierarchy Models.

The primary concept behind the McCall model is to analyze various relationships between issues of external quality and issues of product quality.
Table 3. "Quality Characteristics in Boehm, McCall, FURPS, ISO/IEC 9126 and Dromey Models
Quality as measured by end users and internal quality as measured by developers and programmers is external quality.
• Boehm integrated those elements with the McCall model's focus on the maintainability of software products. Additionally, this model takes into account the factors that are involved in evaluating the software product in terms of its added benefits.
• McCall's and Boehm's models have a hierarchy of features, with the Boehm model containing 19 parameters and focusing on Portability, Conservation, and Usefulness, ensuring consistency and effectiveness.
•However, Boehm's model requires only a hierarchy of characteristic diagrams without any ideas about measuring the consistency characteristics. There was a need for a global benchmark to calculate the performance of information management software in different organizations.
•The ISO/IEC 9126 Model is an international standard for the evaluation of software quality. It was developed to provide a framework for assessing the quality of software products and is divided into four main parts:
1.Quality Model
2.External Metrics.
3.Internal Metrics.
4.Quality in Use Metrics

While its consistency necessitates adaption for particular academic institutions, the ISO/IEC 9126 model offers a comprehensive framework for evaluating the quality of software products, guaranteeing both internal and exterior features.
[15] they have prepared Table 2.13 below, to show six hierarchy quality models that have been studied here. With this tabular design, this is a summary table for comparison between all previous software quality models in terms of the presence of traits or not.

Method Driven Evaluation Models: The evaluation techniques for user interface and office automation software are regulated by preparatory and task regulations, involving structured meetings, interviews, and simplified analysis [5].

2. Criteria Driven Evaluation Models: ISO/IEC 9126 provides a measurable manner for extracting criteria for software quality assessment, forming the basis for various quality assurance procedures and providing a process model with specific meanings and characteristics.

Table 3. "Quality Characteristics in Boehm, McCall, FURPS, ISO/IEC 9126 and Dromey Models"

Software Quality	Boehm	McCall	FURPS	ISO 9126	Dromey
Testability	X	X		X	
Correctness		X			
Efficiency	X	X	X	X	X
Understandability	X			X	
Reliability	X	X	X	X	X
Flexibility		X	X		
Functionality			X	X	X
Human Engineering	X				
Integrity		X		X	
Interoperability		X		X	
Maturity					X
Mainability	X	X	X	X	X
Changeability	X				
Portability	X	X		X	X
Reusability		X			X
Usability		X	X	X	X

3. Fixing the Requirements: ISO/IEC 9126 is a framework for assessing software quality, ensuring that requirements are met through the formulation of quality characteristics [1].

4. Engineering for Usability: Methodological incorporation in usability engineering involves active user participation in the design process of system development, ensuring functional applications throughout the life cycle [7].

3.4 Evaluation Models

The systematic approach to software evaluation, utilizing ISO/IEC 9126 Metrics, standardizes the assessment process by combining descriptive methods with predictive techniques. This approach helps in comparing different types of software evaluation and ensuring effective procedures, [12].

3.4.1 Evaluate Characteristics and Attributes

Software quality is a critical aspect of any business, and it is often measured through hierarchical models that detail the characteristics and attributes of the software, [15]. The basis from which measures for software evaluation can be taken is given by such a hierarchical structure of a software quality model.

In her thesis in 2010, Sanga talk about a methodology for evaluating free and open-source e-learning systems by evaluating metrics, such as the creation of domain-specific quality software models for the selection of attributes [1].

Similarly, Sanga states that in 2006 (Covella and Olsina) stated the need to take user opinions into account when defining attributes for the software's quality-in-use, this is my technique here in my rese

arch. This problem is important because user views vary with respect to attribute recognition.

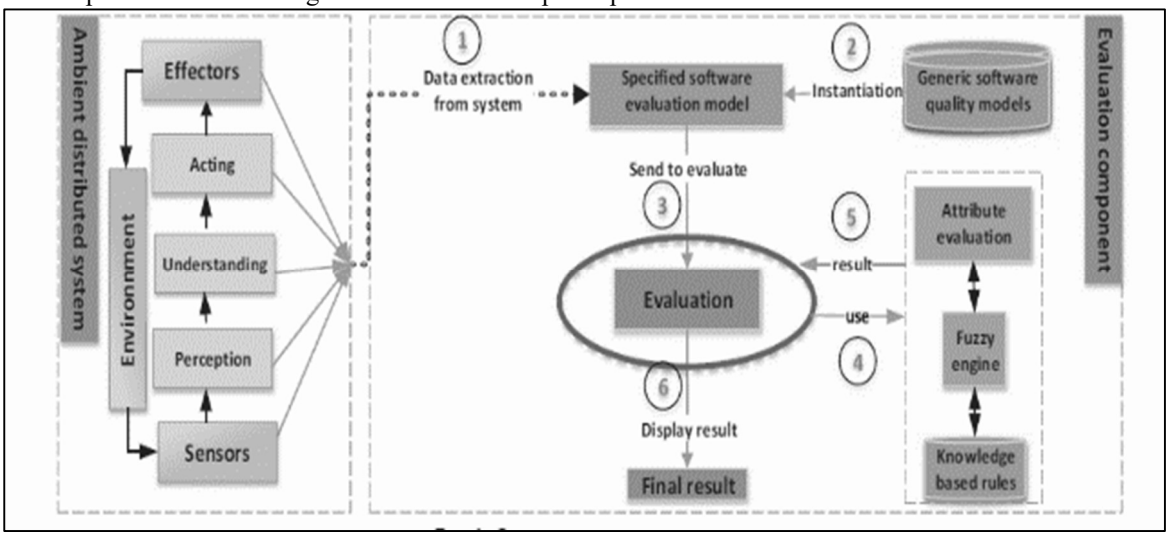

Figure 9: " Quality Evaluation Approach {source (Karaa Cherif, & Lamouchib, 2016)}"

software quality if product attributes are considered.

4. OVERVIEW ON PREVIOUS STUDIES

Similar claims have been published, In this section we will try to look at the previous studies on the subject of Academic Information Systems (AIS), concept and importance, how the previous researcher measure the quality of (AIS) [3].

Al Rawasdeh & Al Matalqa (2006) developed a framework based on the ISO/IEC 9126 model for Commercial Off-The-Shelf (COTS) components, modifying it to remove reusability, configurability, scalability, fault tolerance, and manageability, using stakeholders for quality attributes. The authors introduce a novel model for components using COTS but notes its lack of internal software quality characteristics. The model's manageability attribute is more process-oriented, potentially improving

The research identifies six key factors affecting software quality in information systems (IS). These include organizational factors like management, technical variables like technology suitability and department capability, and user skills. Three of the five models are highly affective, while four of the six have a major influence on software quality attributes.

The study, involving only students, suggests that organizational factors significantly impact software quality, contrasting with technological factors. However, the study's focus on CIOs may result in varying results due to the lack of participation from academic staff. Based on

ISO9126 attributes, they build their new E-Learning System model. The Wang model

comprises three key criteria and 29 sub-criteria, including "learning Community," "System Contents," and "Interactivity," with device material sub-attributes containing current, useful content [5].

Researchers evaluated their new quality model in three Iran-based universities using AHP calculations and structured interviews to select high-standard E-Learning System features for students and staff ,
the author discusses the importance of evaluating the quality of Enterprise Resource Planning Systems (ERP) to propose an acceptable software quality model in the literature [9], these are versions (McCall's, Dromey's Boehm, FURPS and ISO\IEC 9126) .The resulting quality model was used to check whether the ERP job in an educational institution evaluating the quality of the ERP from the user's side could succeed or failed.

The same authors introduced a new ERP System Consistency Model [12]. called (ERPSQM). With its complexity and modularity, the Enterprise Resource Planning (ERP) framework has a different type of principles, real time information and standardization is the essential function of the ERP system. Under the Flexibility, Usability and Maintainability stage, four new sub-features were introduced, including (Modularity, Compatibility, Complexity and Reusability).
In [4] The study "The Evaluation of Software Quality" introduces two new sub-characteristics (Layout) and (Interface Aesthetic) to the 21 most frequently occurring SQ dimensions, figure 9.

A comparative study comparing MSWORD, MINITAB, MS OUTLOOK, and Google Sketch revealed that security is significantly influenced by Consistency, Maintainability, Reliability, and User Precision.

In [9] a framework was proposed to assess the quality of web-based AIS using the perception approach of visitors, developers and institutions. Their AIS quality instrument is based on a variation of the "WBA Quality Model" and "COBIT 4.1" (ISO/IEC 9126, ISO/IEC 25010:2011).

Since ISO/IEC 9126 has a maximum measurement metrics, the assessment's usability feature is the sole aspect of this study that serves as a valuation tool. These overall findings demonstrate that in order to increase the qualitative value and make AIS genuine, technological acceleration and evolution are required.

The purpose of the evaluation is to determine the usability behaviour at AIS administration module

Using ISO/IEC 9126 a standard Software Quality. The framework aimed to accurately measure academic quality web-based information systems and provide detailed recommendations for improved support of E-Business processes in AIS and web-based technology. This proposal work not implemented in a real-world case study. In [9] A new AIS paper examines the usability of an IT'S system's management module, revealing that some attributes, like learnability, are difficult to learn, while others have non-zero values but are not perfect, see fig 10.

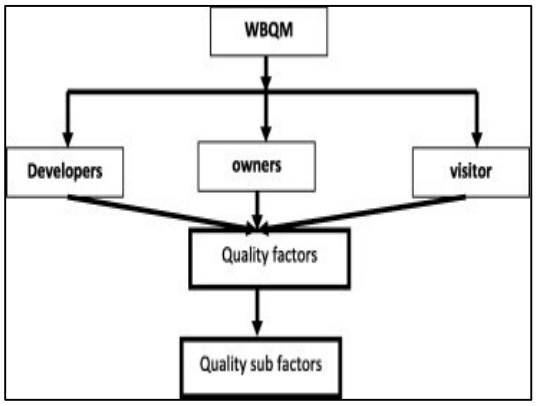

Figure 10: Structure of WBA Quality Model (Source: [9])

In [16] found a connection between software quality and Quality Information Systems (QIS) in software development. A survey of 60 companies revealed deficiencies in providing quality-related information to support and promote improvement. However, graphical information and data can help reduce misunderstanding and help users remember and learn system elements. The study suggests that a relevant QIS model for the software development environment should be developed based on current practices and views. A small paper-based survey sent via e-mail or directly to students at the University of Jordan, which included 240 students from various faculties. This research identified other problems facing students while using the University of Jordan's E-Learning Framework linked to the University Network's hardware resources. the research of Almarabeh focuses only on the students, not all the users of this academic method, such as professors, developers and technical workers. The Usability Assessment Model (UMM) is focused on the strength of usability models; the standard ISO-9126-1 model, (2QCV3Q) model of the Website Consistency Evaluation System (QEM) and McCall model, (Shawgi & Noureldien, 2015) Web-Based Information System Usability Model Outlines additional design requirements for website: support for multiple languages, descriptive comments, legible fonts, help documents, consistency, relevant graphics, well-aligned page elements, menu bar, home page link, frames, and search engine. evaluating software quality and several approaches have been done, they mention that these approaches were limited to a specific use field and did not offer a quality profile enabling them to evaluate a universal software quality model. The evaluation based on Standardization (ISO) models. The objectives of this methodology are to evaluate the software quality during the process organization; the steps 1 to 6 see Figure 14. Fuzzy logic is utilized in software assessment to extract data from various processes, ensuring high-quality software. This method extracts current software models from generic models, resulting in a final numerical result. A study to test the software quality features of AIS on a mobile application was conducted by (Paredes, 2016) using ISO/IEC 9126 criteria in terms of accessibility, reliability, portability, usability, maintainability, and performance. In terms of functionality, the software quality characteristics of the AIS mobile application for using the ISO/IEC 9126 criteria were successful.

To tolerate circumstances, the system maintains its defined attribute, functioning effectively under specific settings, ensuring its performance remains unaffected by resource use. IT experts evaluated system compliance with specifications and system requirements, ensuring

system adaptability without affecting operation. This system's effectiveness was assessed by students, faculty, and staff, demonstrating effective system operation. The limitation of this study is it takes the main ISO/IEC 9126 criteria without investigating sub-criteria. When we handle the sub-criteria of the main quality attributes, the study is more accurate and the results are correct and reasonable.

In their published paper, they identified the definition and concepts of effective Total Quality Management (TQM) [3], Parallels between Software Development and Product.

• Program quality influences system's quality.
• Three aspects of software quality: functional, structural, and process.
• Differences found between studies on information system implementation and post-use times.
• Most studies focus on technical aspects, not complete engineering development steps.

[4] in their study emphasizes the importance of defining software sub-attributes and quality attributes to achieve functional quality, structural quality, and process quality in information system software. Functional quality ensures software performs tasks correctly, while structural quality ensures code is optimized. Software attributes like reliability, integrity, maintenance, and reusability can affect user satisfaction and enhance software performance. Harmonizing quality criteria from user views and capabilities simplifies the identification of quality attributes in software products.

[17] The study at Near East University assessed internal usability using ISO/IEC 9126 metrics, focusing on understandability, learnability, and operability, providing valuable insights for future framework development opportunities.

A Student Information System (SIS) provides management tools for academic purposes, enabling access to system procedures for students, academic staff, and stakeholders. The system's understandability and. usability compliance was rated high, with learnability and operability being acceptable sub-characteristics.

However, attractiveness and usability compliance Was not perfect. An E-Learning Quality Model (ELQ) was proposed by [18] .

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[18] consisting of three dimensions: Service Dimension (Responsiveness, Reliability, Tangibility, Assurance and Empathy). Knowledge Dimension and Machine Dimension (Learning Contents) (Course Web).

Service consideration in E-Learning systems is significant, with learning contents and system quality playing a crucial role in enhancing students' perception of safety, understanding, and reliability.

The Student Information System (SIS) is one of the main systems for promoting the management and growth of higher education institutions (HEI), [12]. The teacher uses the SIS to upload course material to students, students use the SIS to register for online classes, to review their schedule, test schedules, grades and other activation, in figure 12.

The significance of this research is to understand the effect of the consistency of the information system

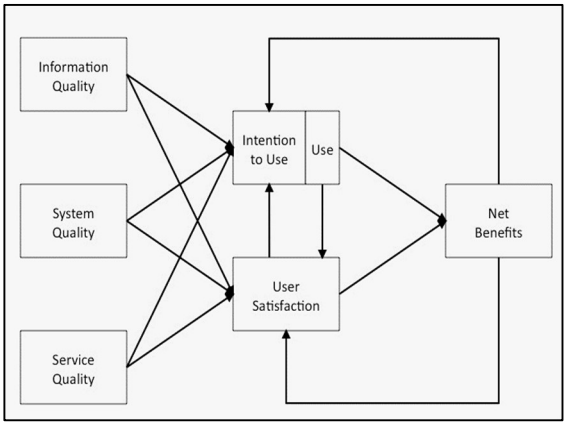

Figure 12: Information System Success Factors

on the satisfaction of SIS academic and administrative workers. They announced that one of the metrics for the software and hardware of the information processing system is System Consistency.

In previously tested survey instruments, sensitive measures such as (Ease of Access, User-Friendliness, System Reliability, and Flexibility) were utilized to assess system quality. The findings show that the system's consistency improves decision-making satisfaction and the quality of information. This indicates that information quality, completeness, relevance, and content needs, as well as information timeliness, all have an impact on SIS user overall satisfaction. Previous research [7] cited in [19]. shows that Information Presentation, which implies bad image formats, more colors and graphics, can badly affect users and cause unnecessary decision-making work, as compared to tables, inconsistency interfaces and incorrectly built displays.

They developed a new methodology to assess and evaluate the performance of the Information System

(IS) [1]. The study applied to two markets, the banking industry and the least computer-focused one, The D&M model was used to create an analytical hierarchy process, with six dimensions.
sourced from literature and studies. An online questionnaire was prepared for data collection. Five companies were selected from each sector to select the best performing IS, the approach used is to establish the evaluation criteria using the performance model of the information system [20].

This groundbreaking model consists of System Quality, Knowledge Quality, Quality of Service, Accessibility, Customer Satisfaction, and Net Benefits parameters, see Figure 15, which shows the method of measuring success factors for IS.
The proposed approach, allows decision analysts to compare the outcomes of a two-sector process to better assess their information system and to provide a more effective, detailed and systematic tool for decision support. Several literature studies have measured the satisfaction and performance of information systems from the viewpoint of students at universities, with various methodologies such as ISO / IEC 9126, Service Quality Model (Serwqual), and DeLone & McLean (IS) Success.
In [19] published his doctoral thesis on Jordanian universities in the realm of e-learning growth inside higher education systems. His research sought to assess the abilities of students and faculty at Al-Zaytoonah University and the University of Applied Sciences to effectively participate in the e-learning systems model. He discovered that faculty members and students prefer direct communication, based on his views and experiences at both universities [6]-[12].
Jordanian teachers prefer an organized setting in which they can connect directly with pupils, regardless of any limitations that may prevent them from participating in such programs. The Jordanian e-learning system is built on modern software quality models and handles preparedness difficulties among professors and students. The system seeks to enhance the educational experience [14].
These publications have been acknowledged in this manuscript to ensure transparency and to contextualize the current study within the broader research landscape.

5. CONCLUSION

This review discusses various quality models for information system software, including ISO/IEC standards, CMMI, and agile methodologies. Each model has strengths and limitations, depending on the application context. The focus is on adaptability and responsiveness to user requirements. There is no single-serve-all quality model, so a flexible approach is crucial for adapting to rapidly evolving technology and user expectations.

The findings disclose that while some models excel in addressing specific quality attributes like maintainability or security, others provide a more complete approach but lack the granularity needed for academic systems. Furthermore, it is evident that a one-size-fits-all approach is insufficient; academic institutions must tailor software quality models to align with their unique requirements, user expectations, and operational constraints.

This research basically argues for a mixture or adaptive approach that will encapsulate the best features of existing models while addressing their obvious shortcomings. The future in this side should be based on dynamic and customizable quality models to take into consideration emerging trends such as AI-driven analytics, user-centric design, and sustainability, to ensure that academic information systems can continue to further evolve and meet modern expectations in education.

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