

# Software System Selection for Open University System

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**Abstract:** *Software quality assessment is one of the key factors for the success of universities, so this study focuses on the study of technical quality. Measurement factors apply to universities in information systems, including software quality. The novel model is used to test whether the implementation of e-learning system in higher education institutions will succeed or fail. The scope of this investigation is free and the evaluated universities have open source e-learning systems that measure and evaluate quality according to our proposed software quality model. Educational Information System (AIS), which combines many software quality standards to help system analysts, system developers, and systems. Programmers in their AIS projects. Quality model, six quality characteristics are shown as the minimum requirements for creating a new model. This has been further enhanced by the expansion of the standard approach to measuring the quality of AIS based on a combination of several. Software quality standards used in these educational systems with new features. Using the novel model to test whether e-learning is implemented, the system will succeed or fail in higher education institutions. Our contribution and development will be discussed on this. The new model aims to guide educational institutions that are in the process of creating their e-learning system to evaluate and select the right software. Features that are essential for the success of the entire system. In addition, this paper provides several reviews of current methods used to select AIS components and outlines their disadvantages in terms of our advanced models.*

**Keywords:** Educational, Information System, A-Learning System, Software Quality Model, ISO 312.

## I. INTRODUCTION

Academic Information System (AIS) is a system that provides educational services in an educational institution, helping users to manage educational activities including their activities that are effective in terms of marketing of educational institutions based on its purpose. AIS becomes an important form in the educational institution as this facility can handle a huge business process in the college. Software quality models play an important role in the success of information systems; It is the critical and essential type of organization quality that usually includes many of the characteristics captured in the model that explain these characteristics and their relationships. The information quality model and its yield are the basic goals of all advanced education departments such as universities. To guarantee quality, it was important to ensure the idea of information systems, including the products used by understudies and workers, whether it be instructional projects, financial systems or resource systems (HR).

One of the weaknesses of the current quality standard is the user's perspective, the emphasis on data and profitability, in which it is important to worry about the educational quality side in the education sector, the profit side. Because of that side view the educational web application is usually used to deliver profitable information and ignore complete and comprehensive software. There are some specific perspectives, which are found only in educational website applications, for example, the use of different programming languages, and heterogeneous and complex programming frameworks. In addition, the ability to adjust multiple platforms, all of these qualities are incorporated into AIS. In addition, AIS organizes support for inputs, outputs, process improvements, and full utility support. Those issues potentially bring up that broader issue.

## II. IMPORTANCE OF RESEARCH

This study is important for creating new educational models suitable for e-learning systems to work for different educational systems. The starting point for the construction of our model is ISO 9126, as it includes the usual software

quality characteristics that are present in the other six models. This novel model identifies the basic features and their sub-features for measuring the quality of software in information systems. Then identify the relationships between them in preparation for comparison, to find potential vulnerabilities.

Then create a standard approach that measures and evaluates the quality of AIS, mixing many software quality standards to assist system analysts, system developers, and system programmers in their AIS projects. All universities can take advantage of this novel model to create their own educational system that meets all the qualities and conditions recommended in this research and become a measure of the efficiency of their system, plus they will save their time and effort in selecting high efficiency software. To support information systems in their higher education sector. Our novel model will reflect the image of the university from the outside, so the university's systems are a road map for the page's guest, whether it's a new student or a student's parent, saving time and effort in addition to choosing high efficiency.

### **III. SUGGESTED METHODOLOGY**

To set the guidelines for our work here, to create a new quality model for information system evaluation, the proposed method is introduced, and ends in the following steps:

- One: Identify high-level quality attributes, and then disassemble each in a topdown fashion. Features in a set of secondary features.
- Two: Develop a new model that implements ideas from an international standards model that identifies attributes for each sub-characteristic, use the characterization property to measure the quality model, which includes all systems to evaluate information systems in higher academic fields such as universities. . . .
- Three: put the pieces together; Creating a new model implementing the ideas of international standards.
- Four: Identify the attributes for each sub-attribute at the product level.
- Five: Find a way to measure the weight of these features, perhaps a questionnaire, which are simple, inexpensive, effective and efficient ways to collect data in a scientific investigation.
- Six: Draw a framework (Information Systems software shows quality-attributes). In future work we will apply data analysis techniques; Our choice will be an analytical hierarchical process integrated with a vague set theory process to evaluate the proposed model in universities.

### **IV. RESEARCH CONTRIBUTION**

The contribution of this study is to identify the main features for information system software quality (ISSQ) from the perspective of users in the proposed quality framework for measuring the learning system as an academic system. -After making improvements and enhancements, the characteristics and features of the first five standard features extracted from ISO 9126. The last one was content quality, which adds up as a contribution based on user reviews. Based on extensive studies of previous research and studies on the quality of information systems software features, these characteristics have been distributed over three carefully selected levels. The study adds some new features and characteristics to measure the quality of software such as system content quality along with its new sub-characteristics, which will be discussed after the student oriented domain, online services and content quality. The enhanced model will be tested by AHP integrated with ambiguous theory to address uncertainty and inaccuracy in-service evaluation during the analysis phase, where comparative judgments of decision makers are presented as ambiguous triangular numbers. A new ambiguous prioritization method, which derives agile priorities from consistent and inconsistent ambiguous comparison matrices through empirical studies to evaluate and select adaptive educational information system (AIS) features among other alternative systems. This model also affects both the development and maintenance of the target system (e-learning), the effects lasting for the lifetime of the target system. In addition, there are no studies on software quality (SQ) for e-learning systems in any type of educational system in Jordan, especially in universities.

### **V. ACADEMIC INFORMATION SYSTEMS**

Academic Information Systems (AIS) are an Information System that supported learning teaching and organized the institutions business process. AIS become an important form in an academic institution because this system can manage a huge business process in a college (Rochimah, Rahmani, & Yuhana, 2015). AIS help users manage institutional operational including its activities in which to take effect in terms of marketing of educational institutions. Based on its

purpose, system. The advantage of AIS web-based is managed by centralized data; AIS has a similar scope with the other webbased applications that are used for public services like health care services, government services, and banking services. Some similarities between them are not only in a large number of users, but also provide high availability, reliability, interoperability, and accountability services (Paredes J. L., 2016). The different aspects between AIS and the other public information systems are its content and business process. AIS must provide a real-time progression and trustable system so it can handle the secure academic results like the Test score, Student graduation, and Student payment.

### **5.1 E-Learning As Academic Information System.**

E-Learning systems allow faculty members to manage their courses electronically and to use technology tools in teaching and communicating with their students. E-Learning system is a new suite of software tools that have been used in an educational setting for less than a decade. Moreover, ELearning enables instructors to extend the classroom beyond

## **VI. SOFTWARE QUALITY**

Software quality is a very abstract phrase that is relevant to define its presence, but its absence is noticeable. Therefore, the desire to improve the quality of software increases. Here, we present some definitions of international and standard organizations for software quality. 1. (ISO / IEC TR, 9126-3, 2003): "Software quality characteristics are a group of features of a software product by which its quality is described and evaluated". 2. German Industry Standard 55350 Part II: "Quality includes all the characteristics and notable features of a product or activity that are related to satisfactory requirements" 3. ANSI Standard American Society for Quality Statistics Division (ANSI / ASQC A3 / 1978): "Quality A Is the completeness of the features and characteristics of a product or service based on its ability to satisfy perceived needs ". 4. The IEEE (Institute of Electrical and Electronics Engineers) prescribes some definitions of quality as "the combined characteristics of software that determine the degree to which the use of software will meet customer expectations". All of these definitions offer different views on quality. Thus, to get the best definitions for quality we need to systematize, clarify and standardize a large number of quality-related definitions.

### **6.1 Pioneer Quality Models.**

The model is the abstract form of reality, enabling the reduction of details and viewing an entity or concept from a specific perspective. Samples can be presented in a variety of ways, such as equations, functions, or diagrams. This makes it possible to show how the components connect, so that they can be tested, their relationships understood and opinions formed. We have observed in our study that different researchers have proposed different models, for example McCall's quality model proposed in 1976, Barry Bohm's quality model introduced in 1978, FURPS in 1987, ISO (International Standard Organization ISO 912 and Special in 1991). Dromi model in 1996. Such models are commonly used to evaluate the quality of software. McCall's model for software quality includes eleven criteria around product operations, revision, and transition, developed in 1976 by the US Air Force and other partners with the aim of improving the quality of software products. The main idea behind the McCall model is to evaluate the relationship between external quality factors measured by consumers and product quality measures measured by programmers. One of the main contributions of the McCall model is the relationship between quality characteristics and metrics. But not all metrics are objective. One aspect not directly considered by this model was the efficiency of the software product (Altavalbeh, Thiam, Alshoreh, and Fong, 2015). Bohem added some features to McCall's model, emphasizing the maintenance of the software product. In addition, this model includes the considerations involved in evaluating a software product in terms of program utility. However, it is similar to McCall in that it presents a hierarchy of characteristics, each of which contributes to overall quality. His model was based on a wide range of characteristics and integrates nineteen criteria.

## **VII. DEFINING THE TERMINOLOGY OF NEW MODEL**

In order to define a software quality model, which should include all features of the AIS system, new features of the systems must be identified. Features and subtypes need to be included, which can cover new features of the AIS system including data synchronization, system complexity and modularity of reusability of systems and modules. Redefining existing quality characteristics and sub-characteristics according to the needs of end-users, developers and analysts. Our model categories match the appropriate characteristics that every stakeholder is concerned about. Our new quality model,

proposed terminology and matrices rules for AIS evaluation are presented and concluded as follows: •Characterization: High-level software is a quality attribute that can be decomposed into sub-characteristics. Sub-characteristic: An object that is characterized by measuring its characteristics. • Attribute: It is an innate property of a sub-characteristic which can be identified quantitatively or qualitatively by human or automated means. This study uses development features with the following main characteristics, new sub-characteristics and their related features along with a brief explanation. 1. Efficiency: The first software quality to be interested in this study is characteristic of efficiency, which means a set of features that tolerate the existence of a set of functions and their specified properties (Al Rawasdeh et al Matalka, 2006). Sub-characteristics of efficiency characteristic are interoperability, suitability, compliance and safety.

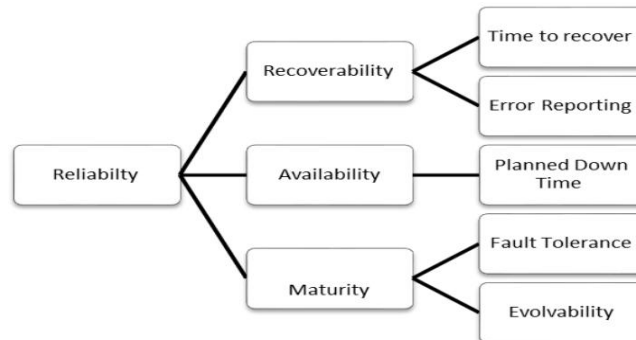


Figure 7.1: Reliability in new model

This study used the sub-characteristics of functionality with their sequential features: 1.2 Interoperability: Interoperability is the ability of a software product to interact with one or more systems. To which degree, one of the system or its components is properly connected, and works with something else (Fleming, 2014). Here the interoperability features will be decomposed into the following: - Data Compatibility: The attribute used to indicate whether the format of the data handled by the Information System (IS) component is compliant with the international standard or convention.

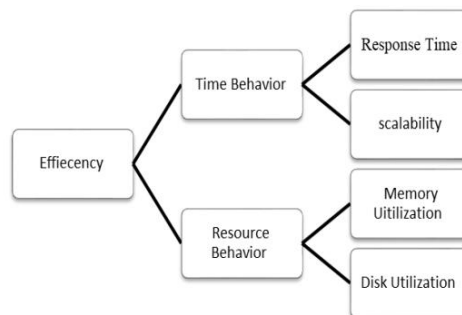


Figure 7.2: Efficiency in new model

The attendance metric indicates this capability and, if so, what standard format is used (e.g. ANSI, ANSI X.12, and XML). - Platform Compatibility: A feature used to indicate whether a component is platform-compatible. If so, this means upgrading or replacing their hardware system without having to worry about changing, redesigning, or rebuilding their hardware

### VIII. CONCLUSION

The study of constructing quality concepts related to improving the quality of the higher education system, including the quality of curriculum content in the e-learning system for students and teachers. In addition, the research also explains the different types of models in software quality. Then create a standard approach that measures and evaluates the quality of AIS in universities, combining multiple software quality standards to assist system analysts, system developers, and system programmers in their AIS projects. All universities can take advantage of this novel model to create their own e-learning system that meets all the qualities and conditions recommended in this research and becomes a measure of the efficiency of their system, plus they will save their time and effort in choosing high efficiency. Software to support their higher education sector information systems.

**IX. FUTURE WORK**

The latter will be evaluated on a case study using this new model. The purpose of the questionnaire will be to disclose students' opinions about the purpose. Importance of specialty quality in e-learning system. In the universities of Jordan. Data will be collected by AHP. The questionnaires were further analyzed and compared by. Analysis of compassion and pair-wise compassion between. Alternatives using the standards AHP approach, then fuzz. Membership function to get the best option.

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