

# Software Quality Assurance Model for Software Excellence with Its Requirements

Syed Zaffar Iqbal<sup>1</sup>, Prof. Urwa Javed<sup>2</sup> and Dr. Shakeel Ahmed Roshan<sup>3</sup>

<sup>1</sup>Department of Computer Science

<sup>1,2,3</sup>Alhamd Islamic University, Pakistan

**Abstract**— The authenticity and entanglement of software is being escalated from step by step, the software value promise must be made to create stability among efficiency and quality. The exercise of seeking software measurement to a software procedure is multiplex function that demands research and directions which conduct knowledge of the estimation of the process in respects to attaining the objectives. In this research paper, we have advocated a new software quality framework/model to experience the contrary factors that modify quality of the software. Moreover, it increases the productivity of the software as designer and implementer face the difficulty in software system. This framework/model shows how to deliver secure, trustworthy and quality product to initiate, by providing all the aspects by transforming software efficiency and quality.

**Keywords**— Software Quality Assurance (SQA), Software Requirement, Software Quality Model.

## I. INTRODUCTION

Software quality should be designed according to the customer's preferences as every application Constance threads. Software development project plays a vital role; they define particular explanation about the software in the planning phase. Such as definition provides according to the setting of goals and applied measures of quality progressive and deduction for liberating the customer's trust. [1] (Lazic, 2009)

Quality advancement modifies production performance in many ways, for instant as enlarging revenue, minimizing cost and enhancing performance. For every business the important attribute which differentiate them from competitors is quality [2] (Meissner, 2008) On the other hand, Ravees and Bednar said that no universal or imitation of quality exists. [3] (Bednar, 1994) The American National Standards Institution (ANSI) and American Society for Quality (ANQ) explained quality as The wholeness of attributes and elements of a product/services that impact its potential to assure the needs that has been fascinated by customers.

Many researchers have initiated apposed quality framework. For example, Gavin [4] (Gavin, 1987) has succeed a quality framework apprising an 8-dimension product quality nonetheless, Parasuraman et al [5] (Parasuraman, 1991) developed a 5-dimension model of service quality as represented in table I & II. Zeithml et al (7) (Zeithml, 1993) described that buyers judge the product by the process of presenting the services to them rather than outcome of the service.

Table 1. Scopes of Efficiency and Quality

Model	Scopes	Definition
Product efficiency and quality	Performance	Primary operating characteristics.
	Feature	Supplements to basic functioning characteristics.
	Reliability	Does not malfunction during specified period.
	Conformance	Meets established standards.
	Durability	A measure of product life.
	Serviceability	The speed and ease of repair.
	Aesthetics	How a product looks, feels, tastes and smells.
	Perceived quality	As seen by a customer.

Table 2. Services of Efficiency and Quality

Model	Service	Definition
Service efficiency and quality	Tangibility	Physical facilitates equipment and appearance of personnel.
	Reliability	Ability to perform the promised
	Responsiveness	Willingness to help customers and provide prompt service.
	Assurance	Knowledge and courtesy of employees and their ability to inquire trust and confidence.
	Empathy	Caring, individualized attention the firm provider gives its customers.

### A. Quality Management

Overseas quality management control system ISO 9001 appropriate in all kind of business. ISO 9001 addresses a company's techniques and procedures. Moreover, handle the quality of provided product and facilities. ISO 9001 provide practical approach of quality management such as advance planning, documenting, implementing, enhancing, and upgrading the following methods (8-12). (ISO, 2000) (ISO I. O.—P., 1997) (ISO I. O.-Q.-P., 1998) (ISO I. O.-R., 2000), 2000. [12] (ISO I. O.-G., 2000).

- Quality management
- Resource management
- Market design
- Product design
- Purchasing
- Production
- Service Provision
- Product Protection
- Customer Needs Assessment
- Customer Communications
- Internal Communications
- Document Control
- Record Keeping
- Planning
- Training
- Internal Audit
- Management Review
- Monitoring and Measuring
- Nonconformance Management
- Continual improvement
- Regularly research

### B. Software Product Evaluation

Alongside with ISO 9001, ISO has also developed ISO 9016. The ISO 9126 series now includes one international level and three non-theoretical reports. (13) (Al-Qutaish, 2009)

- ISO 9126-1: Quality model
- ISO TR 9126-2: External metrics
- ISO TR 9126-3: Internal metrics
- ISO TR 9126-4: Quality metrics

The first document of the ISO 9126 series-quality-model hold two divisions of quality framework/model for software item/product efficiency and quality.

- Internal and external quality model
- Quality in-use model

The first part of the two-part quality model defines 6 attributes in which there are 27 subheadings. These

subdivided characteristics are a consequence of software attributes internally and external are recognizable while using the software of computer system. The second segment of the tow-part model specifies four quality in-use attributes. All the relevant information about this all attributes have been described in ISO 9126- 1.

The ISO 9126 series give the following guideline:

- Sets of software metrics for both internal and external advantages of quality.
- Use of advantages.

## II. LITERATURE REVIEW

Patra and Nakornthip said that, the main issue that the software development companies have been faced is to deliver the product which satisfies the customer needs completely.

The software Development Life Cycle (SDLC) which is procedure contains chain of tasks performed for advancing hat software.

The author described the method for appraising quality of SDCL as well as characteristics, contents and formation. This process is being used for the purpose of assessing SDLC documents characteristics.(Patra Thitisathienkul, 2015)

In the software company, the significant role is to control the quality of the software such as, potential for effortless maintained, reuse and also to assure the reliability of the software development.

However, it is very hard to get such control in a manual management quality as a result; there are many modern software approaches which are completely based on software quality model. (Rositsa Doneva1, 2015).

## III. RESEARCH METHODOLOGY

There are few tactics of this model firstly, we identified the problem of which we are figuring the solution after that we see the feasibility study in which the cost and duration of the problem will be locating. In addition, we figure out the appropriate solution of that particular problem.

Secondly, in the development step designing and coding have been done. Moreover, in the complexity phase here are five activities that is being checked that are; functionality, reliability, efficiency, maintainability, profitability and usability.

Thirdly, through testing phase they main quality will be developing.

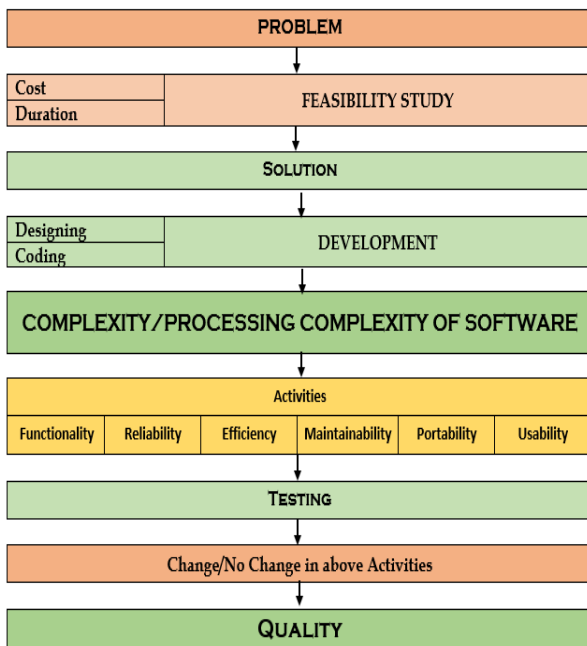


Fig. 1. New Software Quality Framework/Model

A. Problem

Processing Complexity and Complexity of the problem which is the basic issue produced during the requirement phase. This type of complexity and processing complexity is come at the design and implementation stage which is followed by the requirement phase, basically during the design, coding and implementation phases. For this perspective, the complication of a difficulty can be noted as the assets used to reach to utmost solution of the software quality model.

The tricky phase is also recognized as system study. System study is the primary stage of system development life cycle. This provides a clear picture of what really the physical system is? In practice, the system study/analysis of difficult is done in two phases. In the first phase, the preliminary review of the system is done which assistances in identifying the possibility of the arrangement. The second phase of the system study is additional detailed and in-depth study in which the identification of user’s condition and the boundaries and difficulties of the present system are premeditated.

B. Feasibility Study

When a project is first initiated, it is assumed that a new system is feasible to develop and install.

As more insight is gained during the problem definition activity, it is important to confirm that the project actually is feasible during project feasibility, the project manager answers questions such as, are the

expected benefits reasonable? and are the assumed costs realistic.

The objective in assessing feasibility is to determine whether development project has a reasonable chance of success feasibility analysis essentially identifies all the risks of failure the project team assesses the original assumption and identifies other risks that could jeopardize the project success. The team first identifies those risks and then, if necessary, establishes plans and procedures to insure that those risks do not interfere with the successes of the project. However, if the team suspects that there are serious risks that could jeopardize the project, members must discover and evaluate them as soon as possible. Developing a list of potential risk is fairly difficult, which is another reason that experienced system analysts are involved in them. They have encountered and dealt with problems and know where risks are likely.

i. Cost/Budget

Each project is assigned with respective allocation of budget. The money which is distributed for respective project includes the overall latitude of work which comprises designing, coding and development till the accomplishment of the project.

ii. Duration/Time

The software which is assigned is mandatory to be fulfilled within a given span of time. Once the project is completed on time, eventually it becomes viable and generates more profit. However, if the project is not completed on time due to any reasons, then it became problematic and sometimes settled compensations from client’s side.

iii. Logistic

The execution or development of a software, proper logistics have to be scheduled beforehand like the prominent constraints may include transportation, infrastructure, external/UPS power, other power failures and numerous other problems too. In order to make the program run smoothly, one must avoid such pitfalls.

iv. Man power

Skilled manpower is very essential for any business and if any worker leaves in between the project, it could be very crucial for the business. Thus, properly trained and skilled workforce is required to generate profit for any project.

C. Solution

The result can be evaluated as the properties which are consumed in order to implement respective problem.

### *i. Designing*

According to the user necessities and the comprehensive examination of a new system, the new system must be intended. This is the phase of system scheming. It is a furthestmost crucial stage in the development of a system. Usually, the design proceeds in two phases: Preliminary or general design and Structure or detailed design. By the term requirement is meant by specifying what a program should behave with designing and coding phase means how the software should behave. The importance of coding and designing is interrogated by few people, but the people establish the procedure of assuring consistency which propose a very decent software designing and coding processes. The compelling means to reach to it.

### *ii. Coding*

After conniving the new system, the entire system is compulsory to be converted into computer accepting language. Coding the new system into computer programming language does this. It is a significant stage where the defined actions are transformed into control specifications by the help of a computer language. This is also called the programming phase in which the programmer changes the program conditions into computer instructions, which we mention as programs. The programs organize the data actions and control the entire procedure in a system. It is typically affected that the programs necessity be segmental in environment. This supports in fast development, preservation and future change, if compulsory.

In programming language, actually no actual concept of good source code. On the other hand, for humans, the procedure to written a program is important outcome for the maintainers. Various styles of programming source code are like read able and some programming language specific treaties are pointed for the source code maintenance which includes updating and debugging.

### *D. Development*

Development of software is the conversion of a customer/user idea/need goal of market into a computer software product. Development of software is few times comprehended to encircle the processes engineering the software which is joined with the goals and demand of software marketing to expand software products.

Throughout software development a system/software engineer tries to explore how information are to be organized, how task is to be applied within a software construction, how technical particulars are to be applied, how interfaces are to be categorized, how the

designing will be interpreted into a computer language and how testing will have done.

### *E. Complexity and Processing Complexity*

The resources have two parts;

#### *i. Time/Duration*

Time/duration is the computer period and man-hours/man-months.

#### *ii. Space*

Space is the memory of the computer.

In addition, this will assist us to examine what forces like cost/budget, duration/time, logistical or man-power are needed to be understood in order to rectify which aspect will have the influence to the difficulty of the program. The whole indication tells us to see that once we can calculate complexity and processing complexity arises into the software development so it will help us recognize at what stage of software development life cycle, one must ponder to be capable to control and confidently narrow down the hurdles arising in the software development project.

## IV. EXPERIMENTS AND RESULTS

Commonly, the method of data has a set of connected phases where each phase has its district system. Each system contains the models and design that is why each system should be reviewed separately. Each system has input containing of data and quality index for the data.

### *A. Model Validation*

We have differentiated the functional framework/model that tells the well-designed links between measures from the statistic model that tells the prospect allocation affiliated with those quantities. We must take in account the specific problem of CONTINUOUS MODEL in which the solution has scale of values and answered by limited element process and likely methods.

### *B. Validation in Algorithm*

An algorithm is a step by step procedure to solve the problem and mathematical identification of the ideal phases to accomplish a design for example to decide the output magnitudes provided a physical framework/model. However, an algorithm is revealed in mathematics, it is evaluated that it uses limited accuracy on perfection information. Those specifications are scientifically step by step comparable may act mathematically in various methods.

### *C. Validation in Software*

Project enlargement should be followed the methods of the European Community. Although it does not give



the specific guidelines that prove that software are fir for purpose.

#### D. Valuation and Auditing

##### 1) Indication

The information is being applied at all the phases of the software should be recorded with authorize documentation. These recording give us confirmation that the system has been made progressively. In addition, the risk and evidence with analyzation must be noted and verified. Some pro-forma can effortlessly be developed for relation of such evidence.

##### 2) Valuation

The assessment must be built on a comprehensive specific sympathetic of demonstrating, quantitate evaluation and software development and manufacturing so, to determine the suitable validation technique must be applied and the consequences should be appraised.

##### 3) Auditing

After assessment of the software there has a need of auditor which play a third party role so that execution and role of software system can be judged. Through auditing the chances of mistakes in documentation and the evidence will be examining.

#### CONCLUSION

The quality of software assurance is merely an inference to pledge its quality of work and its resulting work to comply with the needs. The criteria of acquiesce to pledge its quality of its performance merely obtained by analyzing it. While it's functioning is displayed by proving it. The software level of attribute is done merely to find software complicity. The software complicity affects software's productiveness to materialize the optimal profit to with minimal profit. The following given miniature demonstrates the relationship between the problem and it's compel which are affecting the whole criteria of software's performance. We review the cons that effect the functioning of software such as its security management, and reliable productivity which make us able to make it more productive.

We also revise the factors that affect its quality. To present the kind of complexity we can clarify that a program which is more composite than others contain more defects and can figure a huge system.

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