

Importance of Quality and Quality Assurance In Software Engineering

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Abstract- Every single part of works which included building a product is having the responsibility to ensure quality in which they are committed to do. In software industry from the starting point of collecting requirements to final phase of implementation a product in user place and later till the maintenance the quality factor is required for providing appropriate and satisfying service to the clients. In this paper the detailed definition of quality, the factors which are improving and affecting quality in software are discussed.

Keywords- Quality, Model

I. INTRODUCTION

The study of quality encompasses lot of key factors to derive it. Following are few International Standard body defined the quality [1].

(i) ANSI Standard: -

“Quality is the totality of features and characteristics of a product or a service that bears on its ability to satisfy the given needs”.

(ii) IEEE Standard :-

- (a) The degree to which software possesses a desired combination of attributes.
- (b) The degree to which a customer or user perceives that software meets his or her composite expectations.
- (c) The composite characteristics of software that determine the degree to which the software in use will meet the expectations of the customer.

(iii) German Industry Standard:-

“Quality comprises all characteristics and significant features of a product or an activity which relate to the satisfying of given requirements”.

Quality factor is inevitable in software industry. A Package of quality broadly divides into two forms as functional and non-functional. Functional point of view is fall directly in the methods and steps which involved in making of a product in the sense quality in coding. The non-functional point has to ensure lot of criteria and which is indirectly mingled with all software process from starting to end of a product. Thus software industry follows lot of methods and steps to ensure quality in their progress.

DIFFERENT FACTORS, METHODS AND PROCESS TO ACHIEVING QUALITY:-

To provide quality for end users, the producers are following numerous of methods according to their environment. In this we are going to see the available process and steps to achieve the goal.

(I) Terminologies and Standards [2].

For prescribing quality there are numbers of terminologies and standards are existed. In or some other way all the criteria which are used to confirm the quality in process will have to cross over the following terminologies. The below table [1] consists of international factors which is stated and followed in America Society for Quality and ISO.

Acceptance	Changeability
Accountability	Co-existence
Accuracy	Compatibility
Adaptability	Confidentiality
Affordability	Configurability
Analyzability	Compliance
Appropriateness	Correctness
Availability	Ease of use
Learn-ability	Performance efficiency
Maintainability	Recoverability
Modifiability	Reliability
Modularity	Reusability
Self-contained	Testability
Time behavior	Transferability

Efficiency	Interoperability
Fault Tolerance	Resource utilization
Flexibility	Robustness
Functionality	Scalability
Helpfulness	Security
Install ability	Technical accessibility

Table[1] Table of Terminologies

II. SOFTWARE QUALITY ASSURANCE (SQA)[3].

In most of systems the predominant technique to achieve quality is SQA. In this method it has variety of process to track the impact of quality. Through the software metrics the quality is measured and documented.

[4] The vital role of management of each organization is to provide good team for SQA process with appropriate environment. With this, Managers will create a quality plan for each individual process and it will publish to everyone in that team. Through this routine everyone will come to know the standard for which they have to work and deliver for the organization.

III. SOFTWARE QUALITY MODEL [2].

A Software Quality Model is the one in which a set of characteristics and relationships between process are defined, thus it provides the basis for constrain quality requirements and to evaluate. Quality Models are existed in different forms to fulfill the goals for which they have been derived. We can classify them into three broader ways such as i) Basic Quality Models ii) Tailored Quality Models iii) Open Source Models. The types of existing models of above classifications shown in the Figure (1)

Basic Quality Models :-

- Mc Call Model*
- Boehm Model*
- Dromey Model*
- FURPS Model*
- ISO 9126 Model*
- ISO 25010 Model*

Tailored Quality Models :-

- Bertoa Model*
- GEQUAMO*
- Alvaro Model*
- Rawashdeh Model*

Open Source Models :-

- CapGemini Open Source Maturity Model*
- OpenBRR Model*
- SQO-OSS Model*
- QualOSS Model*

Figure (1) Types of Models

The basic models can modifiable for any type of software to empower it. The Tailored based models are used in the development process which follows the component based and commercial off the shelf components in it. By the name Open Source the models which are come under this type are free of cost to implement and its try to give the equal quality which is come under the traditional models.

IV. STATIC CODE ANALYSIS [5]

Today in the software industry to develop application it inculcate different languages and methods in it. The main principle to follow for development is workflow based software approaches which capture the business scenarios and identify the faults then and there, Here SCA provides guidelines possible area of error occurring and suggestions to remove the errors. In figure (2) shows the sample workflow based SCA report for the betterment of quality.

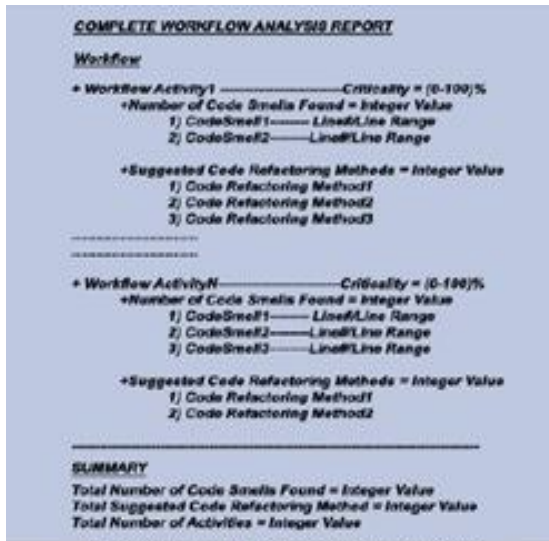


Fig. 2 Proposed workflow based SCA report format

V. SOFTWARE QUALITY LIFE CYCLE [6]

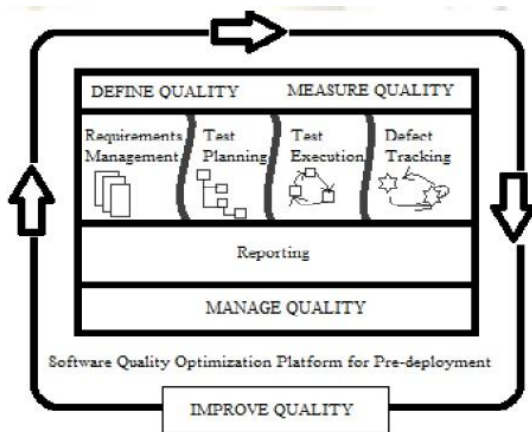


Figure (3) Software Quality Life Cycle

For several management to sustain the quality there is quality life cycle which encompasses of four different key points such as a) Define b) Track c) Measure d) Evaluate in the system. Initially the metrics for quality is defined then process will start to work by that time tracking the metrics, measuring the factors. Finally evaluating the values and producing the quality report.

VI. TESTING & DEFECT MANAGEMENT LIFE CYCLE

[7]. Quality and Testing acts as two sides of the same coin. More we spend on testing, better we get the quality. Testing will take place from initial stage to final stage of work in industry. [8] Software test automation grows rapidly in the years to ensure quality assurance and now it is inevitable from

the methodology of development. This type is implemented in more complicated systems to yield more accurate results.

[9].The best defect management system consists of the following factors in it such as a) Identification b) Analysis c) Prevention d) Resolution e) Monitoring f) Process improvement. From the above factors the defect is manipulated and eradicated in the system to improve the quality. Figure (4) shows the life cycle of defect management.



Figure (4) Defect Management Life Cycle

VII. CONCLUSION

Quality is ultimate by product of all outputs which is made by industries. In specifically it is very important for software industry to sustain their brand value in the market. For achieving it so many methods, protocols, hierarchies are followed in their routine. [10].The few current research areas of improving quality as follow a) Pragmatic Prioritization of SQA Efforts b) Quality Assurance in Agile c) Fostering Software Quality Assessment.

When the technology explores itself to produce effective outputs then the demand of quality factor is also increases proportionally with technology. Since the quality is unavoidable in all process of computer field the scope of research for the improvement of quality is abundant.

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