



Requirement Elicitation in Web Applications: Challenges

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Abstract

Requirement elicitation is a vital activity in the process of requirement development and it discovers the requirements of end users. The successfulness of this process mainly depends on identifying the appropriate stakeholders and exploring their needs and the quality of requirements. This is greatly influenced by techniques adopted during requirements elicitation process. Complete and structured requirements can make projects more consistent. The most common challenges faced by the analyst during elicitation process are to guarantee effectual communication between stakeholders and acquisition of implicit knowledge. Most of the faults in the systems are mainly due to poor communication between stakeholder and analyst, and these faults require more time and money to correct them. The improper understandability during elicitation process of web applications can lead to requirements ambiguity, inconsistency, incorrect and unfeasible [1]. Conversational, Observational, Analytical and Synthetic are available elicitation methods to deal with the difficulty during requirement elicitation process. Selection of an appropriate method or set of methods for the unambiguous, consistent and correct requirement gathering is a challenge for analysts.

Keywords-Requirement Engineering, Requirement Elicitation, Web Application, Web application Testing.

1. INTRODUCTION

Requirement Elicitation is the most critical phase in software engineering. The basic concern is to ensure whether it convenes the requirements for which it was built? What to build? Most of the faults are found during development life cycle. Rectifying the errors at later stages like during or after implementation will result in high cost.[2] So the requirement analyst must pay much attention to remove ambiguity in the

user's requirements in early stages itself.

1.1 Background:

The success or failure of effort of the system development mainly depends on quality of the requirements. This is much influenced by techniques adopted during requirements elicitation phase. Process of studying the requirements of users, and communicating those to developers is called Elicitation. The elicitation is one of the phases of the requirement engineering followed by analysis, integration and validation of requirements. The main objective is to find functional and nonfunctional requirements and also the boundary of the system. There are different stakeholders from various fields and collecting there viewpoints correctly is a great issue. It is essential for the analyst to consider all significant features to better value the system constraints, application domain, business requirements and stakeholders. Nowadays web projects are more fashionable for business resolution. Many companies want to wrap worldwide market, so web applications are a mode to resolve their problems. There are a number of concern in developments of web applications, e.g. global customer requirements, security, information management, customer attraction, service availability, risk measurement etc. Our anxiety is to discuss the problems about the requirements collection for building these large systems.

Analysts have different challenges in elicitation of requirements in large web applications. If requirements are complete and structured then projects more consistent. The key concern for an analyst is to offer the system that fulfils all needs of the end user. More over these projects take more time and of high cost. So if errors are found in later stages it may lead to dissatisfaction of the stakeholders.

1.2 The Purpose

The purpose is to find out main problems in requirement elicitation process throughout development of web

applications. Furthermore, discover how communication has an effect on the elicitation process and the communication issues faced by the analysts while interacting with systems stakeholders. What type of elicitation techniques available to deal with these issues and how they aid analysts in requirement collection,

1.3 The Problem domain

Large projects require high resources for development. If the requirements are unprocessed and conflicting, may lead to project failure or not meet the user needs. So, the challenge is how to bring out the user requirements and how to conquer the obstacle in communication in requirements gathering? What techniques can be used for requirement classification and organization of web contents?

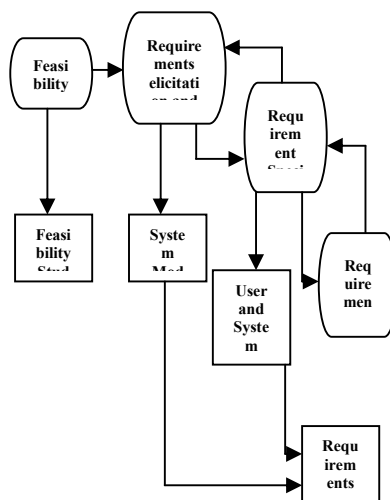
1.4 The objectives

The goal is to identify the barrier in requirement elicitation process in web applications, map these obstacles to the requirement elicitation techniques, and apply suitable techniques for requirement identification to help out the system builders of web applications. The quality of the requirements depends on the techniques adopted during elicitation, because elicitation is about understanding the needs of end users, and corresponding those needs to system developers.

2. REQUIREMENT ENGINEERING PROCESS

The requirement engineering development process consists on feasibility, requirement elicitation and analysis, requirement specification, requirement integration and validation.

The below figure 2.1 shows process of requirement engineering development process.



2.1 Feasibility Study

Feasibility study is initial step prior to requirement engineering process. It is an analysis of the realism of an idea and focal point on trying to answer the question of “Will the given idea work and can we progress with it?” Feasibility study is done on the following issues: economic feasibility, operational feasibility, schedule feasibility, technology and system feasibility and legal feasibility.

2.2 Requirement Elicitation

Requirement elicitation is a vital activity in the process of requirement development and it discovers the requirements of end users. The successfulness of this process mainly depends on identifying the appropriate stakeholders and exploring their needs and the quality of requirements. This is greatly influenced by techniques adopted during requirements elicitation process. [3] Complete and structured requirements can make projects more consistent. The most common challenges faced by the analyst during elicitation process are to guarantee effectual communication between stakeholders and acquisition of implicit knowledge.

The common resources for this phase are:

- End users, customers
- Requirements specifications of customer
- Existing systems documentation
- Existing systems users
- New system users

The outcome of this process is a collection of notes that describes the elicited requirements.

2.3 Requirement Analysis

It involves analyzing and modeling the requirements gathered in elicitation process. It checks the completeness, feasibility and consistency of requirements collected from stakeholders.[6]

Various techniques can be used

- Joint Application Development
- Requirements Prioritization
- Modeling

2.4 Requirement Documentation

Requirement document must be clear and there should be no ambiguity. An excellent requirement document must be complete, consistent, correct and feasible because it can be used as a base for evaluating next process of application.[4]

2.5 Requirement verification and validation

This is a process to make clear that requirement documents are consistent and complete, unambiguous, and the users are fulfilled with the ultimate requirement specification. Organizational standards, Requirement documentation and

organizational knowledge can be considered as input to verification and validation of requirement and it should be agreed and approved by all users.

2.6 Requirement Management

This is used to organize, identify and track the entire changing and impact of this in the project.[5] It is a never-ending process whose objective is to make sure that expectation of user are met by organization.

3. WEB PROJECTS AND ELICITATION BARRIERS

3.1 Web Project

Web applications are worldwide available applications with millions of distributed end users. Each set of users has its usage responsibilities. More distinct feature of large web applications are requirement growth is rapid and contents are heavy to manage. So web applications must be developed in way that they hold up maintainability and scalability.[1]

3.1.2 Characteristics of Large Web Project.

The features of large web applications are

- Its requires multi-disciplinary development group.
- The requirements of the web applications are volatile and diverse.
- These applications must have the ability to handle the huge number of different end users with diverse in age, geography, norms, culture and values.
- Huge number of users with diverse experience and background.
- Contents organization is the major concern of web applications. These applications have heavy contents in the form of texts, images, audio/video based on the nature of the application.
- Multi-tier design architecture with server side technologies, application servers and database servers is used in web applications.

3.2 Elicitation Barriers

In most cases users cannot give explanation of what really they want? For example the stakeholder experiences a crisis but cannot convey and users sometimes does not identify but analyst can identify several issues.[5] As time elapses and with maturation of users thoughts demands also changes.

Problems in requirements elicitation phase of large web applications are classified into three regions scope, volatility and communication.

3.2.1 Scope Barriers

Scope issues are related to boundaries of target application because they may not be well defined.

- **Abstraction level Problems**

This involves the system specification and problem analysis.

- **Problems of Requirement Sources**

Each user brings some cognitive limitations and knowledge into the requirement elicitation process.

3.2.2 Communication Barriers

Most of the errors in the applications may be due to poor communication among analyst and user, and these problems require much money and time to correct them. There are three types of communication barriers.

- Problems “within” User
- Problem “Between” Users
- Problem “Among” the users.

3.2.3 Volatility Barriers

Requirements maturation issues are also known as Volatility barriers. Requirements are collected as the time goes and the stakeholder gets clear about the idea.

4. REQUIREMENT ELICITATION PLANNING AND TECHNIQUES

4.1 Elicitation Process Guideline

It is not possible to get all requirements from origin; the outcome of elicitation process is the requirements. Many intermediary work artifacts are needed for accomplishment of requirement elicitation phase. [7]

Guidelines of elicitation process are listed below:

- **Present Work** - detailed description of specific domain.
- **Present Problem**- detailed list of existing problems
- **Goals and critical problems** -goals and critical problems with present problems.
- **Realistic possibilities** - realistic solutions from diverse stakeholders.
- **Consequences and risks**- severity of risks must be analyzed.
- **Commitment from stakeholders**-allstakeholders must be committed.
- **Conflict resolution between stakeholders**-ambiguity among the stakeholders must be resolved.

- **Final requirements-** a detailed SRS, use cases, sequence diagrams etc.
- **Priorities of requirements-** based on severity level requirements have to be prioritized.
- **Complete and essential requirements-** completeness and consistency must be checked.
- **Interaction diagrams, class model-** using UML do requirement sketching.

4.2 Elicitation procedure

The steps in requirement elicitation process are

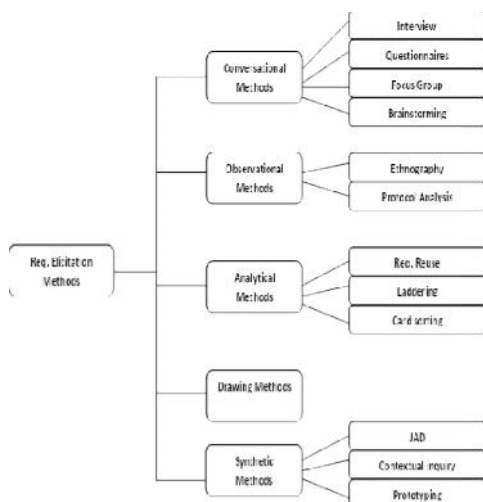
- Entry criteria: the aim and scope of the application must be understood before entering to elicitation process.
- Stakeholders must be identified and documented.
- Questions must be developed for every stakeholder.
- Choose proper elicitation techniques.
- Carry out the elicitation meeting.
- Document suggestions or requests of users.
- Generate or update the requirements vocabulary
- Verify your perception of requirements among stakeholders.
- Verify, prioritize and validate the prerequisites.

Several techniques can be applied for gathering of requirement since it is an iterative process. [7]

4.3 Requirements elicitation methods

There are several means of communication: Conversational, Observational, Analytical, Drawing and Synthetic [3].

Several techniques are employed for elicitation process:



- **Conversational Methods**

This method is based on survey, interview and questionnaires to collect data from users and other sources.

- **Observational Methods**

These methods are used to explore those requirements that are clear but difficult to put into words from the stakeholder. Ethnography, social Analysis and protocol analysis are different methods for observational methods.

- **Analytical Methods**

In analytical methods requirements are collected by exploring already existing knowledge and documentation.

- **Drawing Methods**

For deaf and dumb stakeholders we cannot use any of the above methods. So we can use appropriate pictures with tag for getting their ideas of the project.

Conclusion

Web applications are worldwide available applications with millions of distributed end users. In this paper we present techniques can be used for requirement classification and organization of web contents.

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