

Comparison Of Different Techniques For Software Requirement Elicitation

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Abstract:-To built the successful product, software engineer can concentrate well on requirement gathering process. The collected requirement would help to make the fulfilled software. If any mismatch happened is requirement gatherings, that software would failed. To avoid failure the requirement would be recorded properly. Requirement elicitation had the methods used to choose the technique to handle the requirements. Requirement elicitation techniques are performing depending the customer requirements. Technique differs from one requirement to another requirement. Communication can play the important role between the customers and stack holder. In this paper the different phases of requirement elicitation are discussed for finding, which technique is suitable for the particular software.

Keywords:- Requirement Elicitation, Stack holders, Requirement Gathering, Specification, Customer Requirements.

I.INTRODUCTION

Requirement Elicitation is a process of interaction customer and stack holder. It is used to express the customer needs and expectations. It is the important process to construct the successful software project. If the requirement are unsatisfied to the stack holder or not properly documented, that project will be failed. Requirement Elicitation is having more techniques are used in software. There is no unique technique to work in all situations; it depends upon the customer requirements. Requirement Elicitation is used to gathering the information to construct the software with customer satisfaction. It has any mismatch of

requirement and software that project will be failed and it happened during the poor communication between the stack holder and customer. In this paper customer can approach the three steps they are, project, people and process in the software development using elicitation process. When handling the techniques to be carefully to choose which one is suitable for software project. The quality of software depends on properly documented requirement. Requirement elicitation technique have weakness can be neutralized by some other techniques. The improper requirements are affect the software development. In this paper also discuss the comparison of elicitation techniques.

II.SOFTWARE ENGINEERING

Software engineering is combinations of procedures and systematic applications which are used on electronic machines. If the person has a good software engineering team on our side they will be able to come up with many ways to improve efficiency. According to Fritz Bauer, the institution and use of noise engineering principles in order to cost-effectively obtain software that is consistent and works competently on real machines. There have many suggestions to the many authors. Software Engineering is the work combination of software and hardware. If the person want to be a good programmer, that the person must be well about software engineering process. They have the many type of process, it depends upon the customer and software. It includes the process of designing, construction and testing to different way. It is easy way to identify the bugs and resolve them.

III.LITERATURE REVIEW

Author Name & Year	Paper Title	Objective	Methodology	ReMarks
Saurabh Tiwari, Santoshs Singh Rathore 25 Sep 2017	A Methodology for the selection of requirement elicitation techniques	Most of the time practitioners are looking for a simple recipe that will solve all their elicitation problems.	Comparison with the approaches and case study	Comparison are very useful to study
Shreta Sharma, S.K.Pandey August 2013	Revisiting requirements elicitation techniques	Earnest efforts have been made to place all the major elicitation techniques in the paper.	Phases of the elicitation requirement	Good
Masooma Yousuf, M.Asger 4 April 2015	Comparison of various requirements elicitation techniques	Discuss about the techniques	Types of techniques, advantages and disadvantages.	Very Good

Tabbassum Iqbal November 2014	Requirement elicitation technique: A Review paper	Discuss about the direct and indirect types	Types of requirement elicitation.	Types are useful to defined the structure
Omar Isam Al Mrayat, Norita Md Norwawi, Nurlida Basir December 2013	Requirements elicitation techniques: comparative study	Discuss about the methods to choose the techniques	Comparison of techniques, Methods of requirements.	Good

IV.PHASES OF ELICITATION

In elicitation process have the five types of phases to complete the successful project with the customer satisfaction.

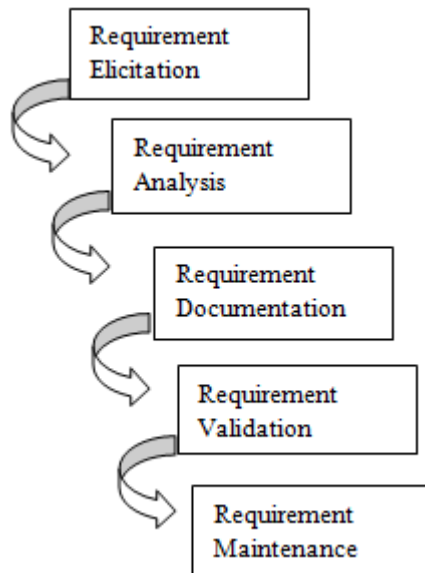


Figure 1: Phases of Requirement Elicitation

i)Requirement Elicitation

In the elicitation process, this is the first stage of the phase to gathering the information. It is used to understand to used and stack holders. Requirement Elicitation used to identify what is expected to achieved and how to be achieved.

ii)Requirement Analysis

Analysis is helps to avoid the more problem during the running project. Analysis the requirement is presents of discover problem that are change to satisfy by the stack holder & customer. They have some negotiation to discuss and solve the conflicts in the requirements. All the conflict requirements identify during the analyzing phase should be negotiated and discussing individually to resolve the conflicts.

iii)Requirement Documentation

It is the third phase of requirement elicitation process. It is the very important phase of the software industry. Each and every work will be documented and that will be maintained. That is the proof of working the project.

iv)Requirement Validation

It is the fourth phase of requirement elicitation. It is after complete the project work, documentation. It is been calculate based on the quality of the project.

v)Requirement Maintenance

it is the fifth phase and final phase of the requirement elicitation. Maintenance is the most important to the project. If they have any necessary to developer the project, that they useful to maintenance period.

V. REQUIREMENT ELICITATION METHODS

In Requirement Elicitation process they have some methods to requirement of the stack holder, this are used to apply which is the suitable technique for the particular project.

- i) Conversational Methods
- ii)Observational Methods
- iii)Analytic Methods
- iv)Synthetic Methods

i)Conversational Methods

It provides of verbal communication between the two or more people. Social relationship is the one of the most common type to communication. It is used to convey the requirements and concepts. They are based on the human efforts. Stack holders definitely have the main participants. Generally, conversational strategies are extremely used in requirements development, however not by itself, they require combining other kinds of techniques, to accomplish the software development phase.

ii)Observational Methods

Observational is non-verbal communication. If gathering the tacit (without direct expression) information that they are weak verbal communication. Uses to understand the domain. Observation is gives the clear idea to the analyzer. It take much time but it gives some clarity to the customer. Some customer can't be expose the need, to see in the system and how they work, when some ongoing processes are to be monitored. Observational methods are used for understanding complex societies, rather than making judgments about improving or supporting the ways of working.

iii)Analytic Methods

There is no participating of the stack holders. They involve the process of evaluation of the problem, preferred product, charts, specifications, user manuals, documenting the activities, but, they form the minor variants, to develop the performance and value of requirements elicitation, principally when the information from legacy or relevant products is re-usable.

iv)Synthetic Methods

Synthetic methods means communication between the clients and designer they are enhance the requirement elicitation process. The synthetic strategies incorporate various channels of communication, and offer models to illustrate the characteristics and relationship of system, they deliver good hints for requirement recognition, in the form of abundant semantic models. For instance, the prototypes offer an initial version of the system to the users, which can emphasize them about the functions which are usually in any other case ignored. Storyboard technique, which is categorized between scenarios and prototyping. It includes combined strategies, which enhance requirements elicitation process.

VI.REQUIREMENT ELICITATION TECHNIQUES

Requirement Elicitation is a variety of techniques. Requirement elicitations are used to choose the techniques with the methods. Technique has the response for selection of appropriate elicitation. For example: Individual preference, project method, resource available, Business procedures.

- i)Traditional Techniques
- ii)Contextual Techniques
- iii)Collaborative / Group Technique
- iv)Cognitive Technique
- v)Innovative Techniques

i)Traditional Techniques

This technique is very complex. In the traditional techniques, the waterfall process was adapted. When one process is ended, another in start at progressing in stage with waterfall model process. They include interview, surveys and questionnaires, prototype. These include a broad class of generic data-gathering techniques such as questionnaires and surveys, interviews, and analysis of existing documentation such

as organizational charts, process models or standards, and user or other manuals of existing systems.

ii)Contextual Techniques

The goal of these techniques is gathering the information at the workplace from the end user. It is useful to get the customer suggestions to design the project. They have the category are Observation, Ethnography and Protocol Analysis. Contextual Technique is a mixture of unstructured interview, workplace opinion, and prototyping. The goal of this technique is to collect comprehensive data about stakeholders, their working procedures, environments, patterns, flow and other relevant area regarding their daily work and then to interpret the data to gain in-depth understanding of requirements and suitable system design.

iii)Collaborative / Group Technique

Collaborative is the team work process with the different stack holders together. They are useful to avoid the some issues when take decision of the project. These techniques include Prototype, Joint Application Development, Brainstorming and Group work. Prototype of the system gives an idea to the user about what he actually wants from the system by providing him the basic interface design. These are considered better techniques because more ideas are generated from all the stakeholders from different backgrounds, more skills and knowledge is involved in making decisions.

iv)Cognitive Technique

Cognitive technique understands the problem in depth. It allows gathering the information and analyzing to be a level of human thinking. These elicitation techniques are based on multidisciplinary approaches as the information on knowledge elicitation methods is widely scattered across the fields of Psychology, Business Management, Education, Counseling, Cognitive Science, Linguistics, Philosophy, Knowledge Engineering and Anthropology.

v)Innovative Techniques

In the elicitation requirement they involve the innovative techniques. Another name of the innovative technique is throwaway paper prototype. Paper prototype is represented the visually to the system. But the customer is expecting the designing in the paper and graphical methods. Following this technique, it is useful to get the more innovating ideas with the user involvement. But this technique is used to small level of project.

II. COMPARISON OF ELICITATION TECHNIQUES IN ELICITATION REQUIREMENT

Table 2: Comparison Of Elicitation Techniques In Elicitation Requirement

Category	Elicitation Techniques	Strengths	Limitations
Traditional Techniques	Interviews	Data collected is detailed and informative. It may be become input for surveys.	Small number of peoples involved. Quality of data gathered depends on the interviewer skills. Difficult to extract accurate information, if not properly planned.
	Surveys	Collect large amount of data from large number of users. Quick analysis of data if designed properly. Cost is very cheap.	Holistic view of system not possible. Data can be vague. It consuming more time. It is used for general purpose software.
	Questionnaire	Quick method to get information from stakeholders. Generally considered as first step to get fundamentals early and planning for further elicitation process.	Lacks mechanism of user clarification and lacks interactivity. Questions can be dis-interpreted Lacks explore further on particular topic or expand new ideas.
	Task Analysis	Provide interaction between user and system. Mostly used by project manager to manage tasks of user and system.	Requires lot of efforts. Needs more details for low level tasks.
	Domain Analysis	Can be useful with other techniques as input. Helpful in analyzing design documents and instruction manuals for existing system.	Quite complex task because of the involvement of different domains. Requires lot of expertise and skills.
	Introspection	Good starting activity of requirement elicitation. Have no cost.	Analyst has to be expert in business processes of the system. It doesn't allow discussion with stack holders and other experts. It is not encouraged if it not used in combination with other techniques
	Cognitive Techniques	Card Sorting	Helps in requirement prioritization. Helps to gain information about customer knowledge.
(CRC)Class Responsibility Collaboration		Provides abstraction. Shows collaboration among classes. Helpful in making UML diagrams.	Not provide much data because of high level of abstraction. Suitable for designer, not for software engineer.
Laddering		Prioritized stakeholders needs. Arrange requirements in hierarchical order.	Maintenance is difficult especially adding and deleting requirement. Complex when there is large number of requirements. It is fixed income and investment is that need for capital amount to yields are low.
Repertory Grid		Traceability among requirements becomes easier. Helpful in identifying various characteristics among domain.	Limited in expressing specific characteristics of complex requirements. Mainly end user or focused.

Group Elicitation Techniques	Focus Group	Very effective to resolve conflicts among stakeholders. Each and every requirement is closely reviewed and inspected. Work group can provide good data.	Difficult to manage if number of stakeholders accumulated at the same time. Requires much effort. Not good, if environment is tense.
	Brainstorming	Helpful in generating innovative ideas. Guides in making major decision about requirements.	Not helpful in tense environment. Quantity of ideas does not always equal their quality.
	Joint Application Development	Creates direct communication with customer. Well-structured approach. Helpful in making rapid decision. Handles changes quickly.	Team should be expert in problem domain. Unable to test validity of solution. It wants to be lots of planning and efforts.
	Requirement Workshop	Helps in capturing comprehensive requirements. Provides complete requirement set. Useful for accumulating large and complex requirements.	It is costly. Slow requirement elicitation. Not useful for small projects.
	Protocol Analysis	Makes all stakeholders participation compulsory.	Chances of conflicts among stakeholders. Sometimes provide vague requirement like talking through operation.
	Prototyping	Useful in developing new system, or system GUI. Helps to gain detailed understanding of the requirements. Stakeholders are effectively involved in requirement engineering process.	Sometimes attention deviates from requirements due to GUI. Expensive in terms of time and cost.
	Ethnography	Useful in capturing social factors and patterns in solution. Collect quality attributes requirements such as usability and efficiency.	Fails in cases where communities are highly diverse. Difficult to analyze social requirement of peoples. New and unique features added to the system might not be discovered.
Contextual Techniques	Observational	Most authentic technique and helpful for analyst to verify and validate requirements.	Sometimes wrong as requirements are not fully observed by analyst. The entire requirement cannot be checked in just a single session, Multiple sessions may be required. It is costly.
	Apprenticing	Helpful if analyst is inexperience with domain. Stakeholder has difficulty in explaining his actions.	Difficult if analyst/stakeholder is unwilling to cooperate. Requires more time of analyst.
Innovative Techniques	No Special technique	Technological advances occur continuously, and requirements often feel the needs to implements the latest changes to keep up with the competition.	All this technology comes with price. While using technology is critical to complete in their project.

VIII.CONCLUSION

In this paper is to present the phase of elicitation requirement. Each elicitation requirement technique has the set of unique characteristic of the applications. Elicitation process is presented the methods and techniques are how to handle the elicitation requirements. This paper teaches how to select the technique for each project with the help of the methods.

Elicitation process is how to deliver the product and in-depth of requirement elicitation.

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