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REVIEW ARTICLE

COMPARATIVE ANALYSIS OF REQUIREMENT ELICITATION TECHNIQUES

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ABSTRACT

Requirement engineering is a science which provides tools and techniques to collect, analyze and implement customer's requirements.RE processes are considered to be the essential part for the success of any project. A lot of research has been done in the field of requirement engineering and suggested that if RE processes are followed by any software development team leads to higher success rate in terms of on time delivery, quality and development cost. In the stages of Requirement Engineering, Requirement gathering and analysis stage has been given the utmost importance. The objective of this paper is to discuss the various tools and techniques available in Requirement engineering to elicit the requirements from customer so as to increase the success rate of software development.

INTRODUCTION

Software industry has seen tremendous growth in the 21st century. But in spite of high demand of software applications and tools, software industry is facing the problem of failed projects in terms of projects going over budget or delayed projects. A lot of research has been done in this area and researchers believe that in the projects where customer's requirements are not gathered and understood properly in the beginning and enough time is not spent in understanding and analyzing the requirements those projects have high scope of failure. Researchers have suggested the Software development life cycle which has five basic stages:

1. Requirement gathering and analysis
2. Designing
3. Testing
4. Implementation
5. Maintenance

Out of these five stages the first stage of requirement gathering also known as requirement elicitation is given the utmost importance. If enough time is given to requirement elicitation and requirements are collected and understood in right way and at right time then there are very less chances of project failure. But requirement elicitation is a big challenge in front of software engineers as either customers are themselves not clear about the requirements or they are not able to express what they want. So the job of software engineer become very complex and tedious. The complexity of the task has given birth to a new branch of software engineering known as Requirement engineering which suggest various tools and techniques to effectively elicitate requirements of the customer. The aim of this study is to comparatively analyze the various requirement elicitation techniques and to understand which one is the best and can provide positive results.

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Requirement Engineering

Requirement engineering is a science which provides tools and techniques to collect, analyze and implement customer's requirements. It is an important part of the System Development Life cycle which has the objective of collecting quality requirements from the customer effectively at right time, analyze and document them to be used by software engineers while designing and implementing software so as to produce the project which is up to the mark of customer satisfaction (Davey and Cope 2008). The process of RE is iterative in nature (Stevens *et al*., 1998; Kotonya and Sommerville 1998 and Sailor 1990). In System Development Life Cycle, RE processes are performed in the beginning (Thayer and Royce 1990) but in the large and complex systems development, requirements of customer keeps on changing, it is very impractical that set of requirements identified in the beginning should remain stable (Royc 1987). Therefore, requirements engineering is an incremental and iterative

process and are performed in parallel with other system development activities such as design, coding etc. Requirement Engineering processes have two stages:

Requirement gathering: This stage include collection, analysis and documentation of selected set of requirements.

Requirement Implementation: This stage include execution of identified set of requirements to design and code the project. Out of these two, requirement gathering is the most important task. Many techniques have been developed to elicit ate the requirements which are as follows:

Interviews: The easiest and the popular technique to elicit requirements of the customer is through Interviews which involves verbal communication of the software engineers with the customer (Gunda 2008). Interviews could be formal or informal. Formal interview further could be structured or semi-structured. In the structured interviews predefined set of questions are used by the interviewer and in the semi-structured interviews blend of predefined and unplanned questions are used. Informal interviews are purely unstructured in nature and does not involve predefined questions. The structured and semi-structured interviews are used to collect quantitative data and informal interviews are used to collect qualitative data (Arif *et al*., 2009-2010) .

Surveys: The another economical technique to get the requirements is through surveys. Surveys are conducted when the users from whom the requirements are to be collected are not at one central place but are scattered in large geographical area. It is the economical and fast method to collect and analyze data through surveys.

Questionnaires: The questionnaire is another time and cost effective technique of collecting the requirements. The questionnaire should be designed in very concise and structured way and questions included in the questionnaire should be clear and precise so as user can easily understand and give appropriate answer. This technique has one drawback as it has no mechanism to seek users' clarification on the topic.

Task Analysis: This technique does not involve any formal or informal discussion with the customer rather it construct top-down tasks hierarchy of the system to collect the requirements from the users.

Introspection: This technique requires an experienced and expert system analyst as in this technique no formal interviews or questionnaires are used rather analyst use their experience and expertise to get requirements of the customers in terms of their expectations towards the new system. This technique can be useful if analyst has the complete knowledge of the working area of the customer and the business processes used by the user (Arif *et al*., 2009-2010; Zowghi and Coulin 2005).

DISCUSSION

In this technique the analyst call the group meeting of all the stakeholders involved in the system and discuss all the aspects of their requirements. It is very effective method to collect requirements as all the stakeholders are at one place and all the conflicts which arises between them are resolved there only with the help of analyst and gives better understanding of the problem area to the analyst. However, it requires a strong leadership quality in the analyst to control all the stakeholders at one place at the same time (Arif *et al*., 2009-2010; Zowghi and Coulin 2005).

Joint Application Development (JAD): The technique which incorporates the planned structure and elicit requirements from a large number of stakeholders through open discussion is known as Joint Application development. The main advantage of this technique is that it helps in fast decision making as all phases, activities and roles of the participants are already defined for the session by the business analyst**.** The main emphasis of the JAD session is discuss and explore the requirements of business and users, it does not take in to consideration the technical issues. The main disadvantage of this technique is its characteristic of being agile because of which sometimes requirements are not validated (Arif *et al.,* 2009-2010; Zowghi and Coulin 2005).

Prototyping: Prototyping is the technique in which product is developed in different versions. The first version is designed by collecting the requirement from the customer using interviews or JAD techniques and is given to the customer for usage. After using it customer gives the feedback and suggest the changes then as per the feedback new version of product is designed and again given to the customer for usage. The process is repeated till all the customer's requirements are not met. It is a useful technique to design new and fresh applications with GUI interface but it is a costly and time consuming technique (Arif *et al*., 2009-2010; Zowghi and Coulin 2005).

Use cases: Use cases incorporates the story telling style to elicit the requirements from the customer. It is a informal method in which all the processes are discussed in narrative way and helps in validating the requirements with the customers.

Observation Analysis: in this technique the analyst visit the customer's site and collect the requirements by observing the working area of customer (Gunda 2008). It is a useful method as there is no scope of misinterpretations as requirements are not collected through communication between analyst and customer but through observing all the activities performed by the customer.

Conclusion

Requirements elicitation is the most tedious and important task of requirement engineering processes and demands skill, experience and expertise. The entire development and success of project depends upon how the requirements are collected, understood and implemented by the requirement engineering team. To cater to the needs of customer effectively the RE process needs to be iterative and flexible so as to meet the changing requirements of customer and requires maximum user involvement. After studying the different techniques of

requirement elicitation, it is concluded that each technique has some merits and demerits so it is suggested to instead of relying on one single technique, a combination of two or more techniques to be used to successfully collect the requirement of the customer.

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