

Bottom up Approach for Better Requirements Elicitation

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ABSTRACT

In software development life cycle the most important step is requirement elicitation as all the success of software product depends upon this phase. There are many methods of requirement elicitation exist because this phase is the backbone of software development. All methods are somehow performing well, but there is always a gap between the software development team and end users. To overcome this issue, we propose a unique approach by gathering the requirements in a bottom up manner. This approach shows some extraordinary results when we perform it on a high-level organization which have a complete body structure.

CCS Concepts

•Software and its engineering → Software system structures; peer-to-peer architecture;

Keywords

Requirements Elicitation; software development life cycle; Direct Methods; Indirect methods; Bottom up

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1. INTRODUCTION

Software Requirement elicitation is a vital step while developing a software project. In requirements elicitation, we want to know the actual desires of different stakeholders of the software system. In software engineering the term requirements vastly used since 1960 [1]. For a successful software project the baseline or key component is requirements elicitation which guarantees the successful delivery of the software product.

Most of the time the main reason of software failure is due to the techniques used for requirement elicitation are not up to the mark. That's why a good technique can reduce the gap between the developer and end user. Requirements management process always under consideration throughout the complete life cycle of software development. By using UML (unified modeling language) requirement can be managed, and some of them are generated automatically through prototypes [2, 3, 4].

Many researchers in the field of software engineering have presented multiple Requirement elicitation techniques [3, 5, 6]. As Babok proposed 9 techniques of requirements elicitation which includes Brainstorming, Document Analysis, Focus Groups, Interface Analysis, Interviews, Observation, Prototyping, Requirements Workshops, Survey / Questionnaire.

Majorly there are two types, first one is direct requirement elicitation approach and another one is indirect approach. Like if we talk about the interviews of end users by a system analyst for software requirements, this is called the direct approach. And some information cannot be collected directly so we need some indirect methods to obtain the requirements like documents analysis and Questioners, are the examples of indirect approach.

In this paper, we are going to propose a different approach for requirement elicitation. Which can be helpful while developing a software product. As this approach is designed after performing some important task which will be described

later in this paper.

2. REQUIREMENT ELICITATION

Requirement elicitation techniques are the process of software development in which system analyst understands the problem, demands and expectations of the customer, so that software engineers and other team member can develop the system according to the needs of the user.

Requirement elicitation includes an arrangement of exercises that must take into account for correspondence, prioritization, arrangement, and coordinated effort with all the significant stakeholders. It should likewise give solid establishments to the rise, revelation, development of prerequisites as a major aspect of an exceptionally intuitive elicitation prepare. Prerequisites elicitation includes exercises that are seriously informative. All steps increment in essentials when one considers the "way of life crevice" or, then again essential semantic contrasts isolating the issue, owning and the critical thinking groups when endeavoring to participate in significant discourse. Incremental steps are just like feedback generated by prototypes.

3. TYPES OF REQUIREMENT ELICITATION TECHNIQUES

There are mainly two types of requirements elicitation techniques which are most of the time used while gathering the requirements of the end users, first one is direct method and the second one is the indirect method. On the basis of means through which we are collecting the requirements, it is decided whether it belongs to direct approach or indirect approach [7, 8, 9, 10]

3.1 Direct Method

In direct method, the reason for existing is to improve the comprehension of the issues of framework that is as of now in utilized. In this method system analyst and end user are directly involved. And most of the time they are physically present to discuss about the system. Most basic methods utilized are Interviews, case considers, Prototyping. With these instruments a thorough and complete investigation of adding up to the system can be finished [11]. In this linger it regards getting the more information about the framework and certifiable information. All together for these techniques to be triumphant, as system experts must be sensibly intelligent and willing to share data [12, 13, 14]. In direct method system analyst try to seek, uncover, acquire and elaborate the requirements by some sort of direct methods like direct face to face interview with the end user, some social media communication medium like interview through skype, messengers, etc. Direct methods show some excellent results on large scale organizations but problem is that many top level management officials have to time for meeting which may not give complete information for requirements of the software system.

3.2 Indirect Method

Some information cannot be collected directly so we need some indirect methods to obtain the requirements like documents analysis and Questioners, are the examples of indirect approach [15, 16, 17]. In this method, most of the time user and system analyst are not physically present, they do some session like by filling the questioners, by some figures

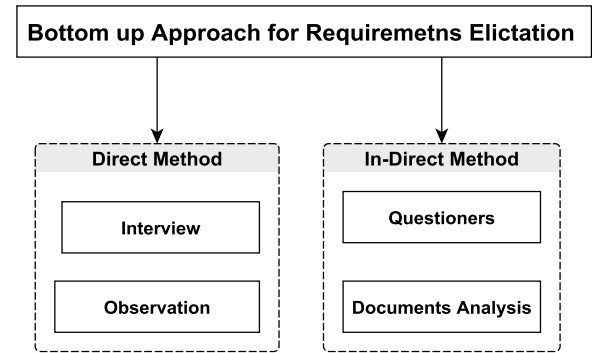


Figure 1: Bottom up approach contains both direct and indirect methods of requirement elicitation

or graphs so indirect method is a bit time consuming but it gives the information complete and comprehensive. Some famous tools and software are used in indirect requirement gathering like by making Google forms we can get reviews of end users. The main disadvantage of indirect method is that most of the end user not know about the documents analysis and questioners, they most probably answer in hurry or if they are not in position to answer they just answers the questioners without understanding the terms used in document. So, the lack of communication is always there in indirect methods which may leads the project towards the failure. So, to avoid such kind of issues we are going to propose some different methods for requirements elicitation.

4. PROPOSED BOTTOM UP APPROACH FOR REQUIREMENTS ELICITATION

For better requirement elicitation, we have proposed a unique approach for big business organization. Organizations which have a complete body structure (like from end user to CEO of the company) [18, 19]. This approach is a combination of both direct and indirect elicitation methods as shown in Figure 1. As in our methodology System analyst and his team wants to collect requirements for software projects of a large organization, so they will use both direct and indirect means to gather requirements, but they will start from the bottom line of the organization as most of the interaction with software system is always by the end users. After that they will conduct interviews of managers and collect their requirements and at the last phase of requirements gathering they will interview the CEO of the company. As we can see the interaction with system decreases as we move from bottom towards the top of the organization to get the requirements from all the stakeholders.

As we can see in Figure 2 the flow of an organization is shown in a bottom up manner so system analyst firstly conducts the interview of end users of the system, then also provide the questioners so that the maximum information regarding requirements can be obtained. The main advantage of this technique is that requirements will be gathered from low level to high level system needs.

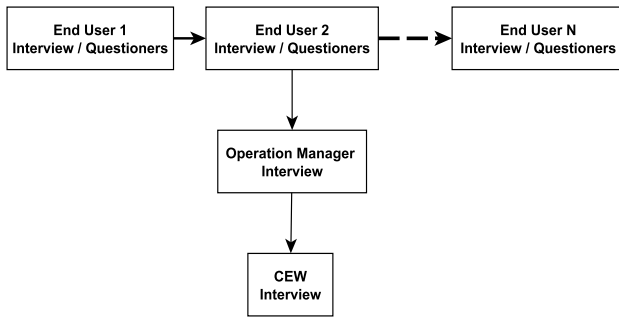


Figure 2: Structure of an organization and bottom up requirements gathering process.



Figure 3: Results comparison of Bottom up approach with different methods of requirements elicitation.

5. EXPERIMENT

To evaluate our technique, we used Google forms (questioners) and interviews through physical presentations and by some virtual means like Skype or any other communication medium. System analyst meet all the members of the organization and list out the requirements. Performance evaluation of different methods is shown in Figure 3. To complete our experiment, we target a well-organized large-scale organization which have almost 1000 plus employees. We divide the employees into three categories as we shown in Figure 2 and then applied a combination of direct and indirect methods for requirements elicitation. Proposed methods have shown some excellent results when we compare our techniques with existing methods.

6. CONCLUSIONS

There are many methods of requirement elicitation exist because this phase is the backbone of the software development life cycle. All methods are somehow performing well, but there is always a gap between the software development team and end users. To overcome this issue, we propose a unique approach by gathering the requirements in a bottom up manner. This approach shows some extraordinary results when we perform it on a high-level organization which have a complete body structure. In near future, we will explore our methods on some worldwide famous organization

also try to improve our methodology by proposing different means for requirements elicitation.

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