ABSTRACT

The objective of software engineering is to develop and adapt software systems to satisfy user's needs, schedule and budget constraints. Many software development projects fail because the resulting software does not satisfy user needs. This is because of the lack of face-to-face communication and the need of people feeling comfortable with the technology they use.

Gathering and managing the requirements effectively are key factors to a successful software project. The process of determining user needs is generally termed 'requirements elicitation'. One of the most difficult tasks to model is requirements elicitation under Requirement Engineering (RE) phase. Many software projects have failed due to poor elicitation of requirements. It is essential to note that the elicitation of requirements is an important part of software development regardless of the type of project or system under analysis. In addition, it is almost usual that every Information Technology (IT) professionals will at some point be called upon to conduct requirements elicitation in one form or another. Hence, the production of high quality requirements through effective and efficient elicitation is very essential for the engineering of successful software products.

Although there are many possible reasons for software failures, if analysts practiced more effective requirements elicitation, fewer projects would fail. Although hundreds of requirements elicitation techniques have been developed by researchers to aid analysts in effectively determining user needs, few have ever been used by practitioners.

Once a requirement elicitation technique that does not fit the current project is selected, the project is bound to fail. Selection of the most appropriate elicitation techniques for a software project based on the project's characteristics is a non-trivial process and a common challenge faced by software developers. In order to facilitate elicitation techniques selection, a mathematical model of the requirements elicitation process is proposed in this thesis. The critical role of knowledge in its performance is discussed. A meta-process of requirements elicitation and selection of an appropriate elicitation technique is well embedded in the model.

The knowledge-intensive nature of current global software development efforts poses interesting challenges. Software organizations need to manage knowledge in all stages of software development. However, to model elicitation in a way that makes clear the critical role played by knowledge. The model proposed in this thesis captures the critical roles played by knowledge in both elicitation and elicitation technique selection. This model was developed based on surveys and interviews of experienced software developers and experts from industry and academia.

The ideals of the proposed model are:
- Better perceptive of the requirements to be performed during elicitation assist analysts to improve their elicitation efforts.
- Better perceptive of how elicitation techniques are selected and how it helps novice analysts to become as successful as more experienced analysts.

- In view of the fact that one can get better ability to perform elicitation, the likelihood that the system that is created will meet their intended customers' requirements is improved.

- To characterize typical requirements engineering techniques and subsequently use them as base for selecting appropriate techniques at the time of starting a project as well as at the time of recognizing a change in the project nature or overcoming obstacles in defining a suitable set of requirements.

- Highlights an approach that proposes a way of choosing the most suitable elicitation technology for a given group of people, taking advantage of information about stakeholders' cognitive characteristics.