

# So, You Think You Are a Requirements Engineer?

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## Abstract

*The success of a task relies on the expertise of its owner to a great degree. But what is the anticipated expertise? In what areas? Our research intends to investigate the skill sets anticipated of requirements engineers. This paper presents a model of the varying levels of RE expertise within the context of the main RE domains. Identifying the layers of RE expertise can provide more realistic expectations of the anticipated expertise. This understanding can in turn be utilised to increase tool usability (by embedding appropriate support for users' expertise), course development (by identifying the anticipated competencies a student demonstrated at the end of a course), task allocation and employment in industry (mapping capability required to a person's expertise).*

## 1. Introduction

It is a widely accepted reality that a method or tool is only as good as the person utilising it. A poor understanding of the skills set necessary to carry out an activity or unfounded assumptions of the requirements engineer's competencies can lead to poor work products [2, 5]. Consequently, this poor understanding has an impact on the following:

- a. **Effectiveness:** Project success is determined to a large degree by the expertise of its members. The composition of a team needs to cover the range of skills necessary for effective requirements engineering.
- b. **Usability:** A method or tool's success increases relative to user satisfaction. This axiom is true of all users of any tool or method. A good tool should enhance or extend a requirements engineer's level of performance.
- c. **Education:** Students need to be equipped with appropriate level of expertise before entering an industrial setting. Achieving the expected level of expertise attained by students successfully completing an RE course means getting a step closer to simulating real-world environment.

Subsequently, the need to identify the expertise becomes one of the key factors of successful team

collaboration and work products, tool effectiveness and support in addition to an effective educational course.

An investigation of expertise leads to a sequence of questions. What makes a requirements engineer? While the areas of expertise expected are identified (elicitation, analysis...etc), the competencies have not be adequately explored. Conducting an interview during an elicitation session, for example, requires the requirements engineer to have a level of interpersonal communication expertise. What is the minimum communication expertise necessary? Does it naturally increase with the experience? How can we determine whether or not a requirements engineer possesses baseline expertise? If the requirements engineer does possess baseline expertise, how can we determine an individual's level of expertise? While a requirements engineer can be proficient in one domain, how well does the individual perform in others? How can we determine an individual's strength and weakness?

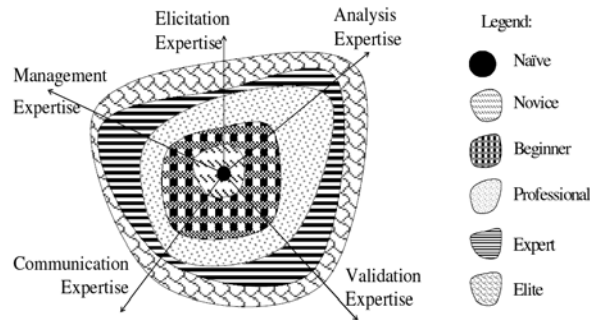
One of the objectives of this research is to answer these questions and others relating to RE expertise.

## 2. A Model of Expertise

In 1979, Boehm reported, there existed discrepancies between what professors felt were critical software engineering issues and what was being covered in software engineering courses [6]. One of the "critical issues" not being covered at the time was "requirements planning". It was considered inappropriate for a computer science course. While progress has been made in that respect with the introduction of RE courses in several academic institutes (e.g. 1, 3, 4), discrepancies still exist between anticipated RE expertise and the expertise that requirements engineers actually demonstrate.

Figure 1, is an abstract model of RE expertise as proposed by this research team. The axis represents the baseline expertise necessary to conduct RE activities and the shaded areas represent the levels of expertise. The model is based on our initial review of literature and will be validated through an oncoming empirical study.

A definition of each of the axis and the competencies that each encompasses is presented below:



**Figure 1: A model of the key RE areas of expertise and the level of expertise attained by requirements engineer.**

1. **Elicitation:** Includes the competencies necessary to identify product features.
2. **Analysis:** Includes the competencies necessary to decompose an existing reality into components and identifying the relationships amongst the components.
3. **Communication:** Includes the competencies necessary to communicate both verbally and otherwise the results of all requirements activities which includes (but is not limited to) elicitation, analysis, all stages of requirements specification, validation processes and results, and management activities.
4. **Validation:** Includes the competencies necessary to demonstrate that the documented requirements define the system identified through the elicitation activities.
5. **Management:** Includes the competencies necessary to manage all requirements work products, inter-personal interaction, activities associated with software management (i.e. estimation, milestones...etc), resource allocation...etc.

The expertise defined within the inner sphere of the diagram is inherited by the outer sphere to avoid repetition.

1. **Naïve:** a person with little or no requirements knowledge. For example an end-user who only has an understanding of what the term “requirements” means. High school graduates would fall into this category.
2. **Novice:** a person who has completed a single Software Engineering course and has an understanding of the RE process.
3. **Beginner:** a person who has completed an RE course and therefore has an academic

understanding of the RE process activities with the development cycle. The person has also effectively implemented RE activities.

4. **Professional:** a person who has conducted one or more of the RE activities for 1-5 years and is capable of supervising requirements engineers.
5. **Expert:** a person who has conducted most if not all of the RE activities within the last 5-10 years at least within both industry and academia.
6. **Elite:** a person who has conducted all RE activities for over 10 years and is considered a reference by practitioners in industry and within academic circles.

Figure 1 is an abstract representation of these levels of expertise. A more accurate representation can only be presented after conducting an extensive empirical study.

### 3. Future Work

Research is ongoing and future work includes conducting the following to validate our model:

- An empirical study within the RE community.
- A survey of expectations perceived by organisation human resources departments and practitioners.

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