

# Requirements Engineering: How do you know how good you are?

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## Abstract

*Organisations are seeking to improve the way they undertake engineering activities. There are numerous ways of doing this, one of which is to undertake an on-going process, or capability, enhancement activity. Praxis Critical Systems Limited provides support for such activity based primarily around the REVEAL® requirements engineering method. By providing customised training and coaching in REVEAL®, we aim to build up a long-term sustainable skill in the client's organisation.*

*Both Praxis Critical Systems Limited and the client need to measure the effectiveness of the knowledge transfer. To meet this need we have developed the REVEAL® Competency and Assessment scheme. This paper discusses the steps in this process and shares some experiences of using the scheme both in-house and with two major clients.*

## 1. Introduction

When providing a Capability Enhancement service, both Praxis Critical Systems Limited and our client need a way to measure the effectiveness of the knowledge transfer. The measurement needs to be easy to implement with minimum overhead. It needs to be unambiguous, yet flexible enough to adapt to current client procedures.

In order to measure the Requirements Engineering capability of staff (both internally and within client organisations), Praxis Critical Systems Limited have developed the REVEAL® Competency and Assessment scheme. The

scheme follows the structure of existing competency guidelines for safety-related system practitioners developed jointly by the Health and Safety Executive, British Computer Society and Institute of Electrical Engineers [1]. By following this structure, we aim to provide a consistent, quality approach to assessing competency in REVEAL®.

The scheme centres on the assessment of an individual's capability in each of up to eleven REVEAL® competencies. Each competency maps to the type of work the individual may be required to undertake. These competencies cover requirements engineering stages (from scoping the problem to validating the requirements) and the personal skills required for good requirements engineering (such as communication skills and application domain knowledge).

The process combines self-assessment, gathering supporting evidence and one-to-one review with a REVEAL® Authority. The REVEAL® Authority requires knowledge and experience of REVEAL® and the leadership skills required for personnel appraisals.

## 2. Competency and Assessment

The purpose of the REVEAL® Competency and Assessment scheme is to provide an effective mechanism for measuring an individual's capabilities in REVEAL®. By measuring each of the eleven areas of competency, the skills profile of each individual, the project team and the organisation as a whole can be measured. This allows an organisation to allocate staff to projects more effectively and to identify training needs.

The scheme grades each individual as being a Trainee, Supervised Practitioner, Practitioner or Expert. The competencies are grouped into two categories: REVEAL<sup>®</sup> specific competencies (based on the stages of the REVEAL<sup>®</sup> process) and General competencies (skills upon which any requirements engineer relies).

#### REVEAL<sup>®</sup> specific competencies:

- Defining the Problem Context
- Identifying Stakeholders & Elicitation
- Analysing and Writing
- Verification and Validation
- Identifying and Resolving Conflicts
- Managing Requirements (including Tools)

#### General competencies:

- Application Domain Knowledge
- Concepts and Principles
- Communication
- Conceptual Thinking & Open-mindedness
- Systems Viewpoint

### 3. Assessment and Review Process

The REVEAL<sup>®</sup> Competency and Assessment process is based on self-assessment, supported by evidence of previous work, and is followed by a review by the REVEAL<sup>®</sup> Authority. For each competency, the individual is rated as Trainee, Supervised Practitioner, Practitioner or Expert. An overall assessment level is also provided.

The process includes guidelines for the assessment. There is a sliding scale of understanding for each competency: a Trainee understands the basic theory, a Supervised Practitioner has some direct experience, a Practitioner has proven ability, and an Expert may be able to expand the concepts for a new domain, or troubleshoot a complex problem.

The self-assessment typically takes around an hour, time taken gathering supporting evidence depends on the individual, and the review would usually be an hour-long meeting. We have found that the review interview is most effective when two experienced requirements engineers conduct the interview.

### 4. Assessment Output

Individuals are presented with a REVEAL<sup>®</sup> Competency and Assessment certificate, which is signed off by the REVEAL<sup>®</sup> Authority and the appropriate 'Capability Owner' within the client organisation.

The assessment results are recorded on an MS Excel spreadsheet, and can be presented in a range of different formats. We have found that a simple graph is useful for individuals, as this readily illustrates any areas where the individual may be weak. For an organisation, we have found that a 'radar chart' of the aggregated competency results is useful for displaying 'before' and 'after' capability.

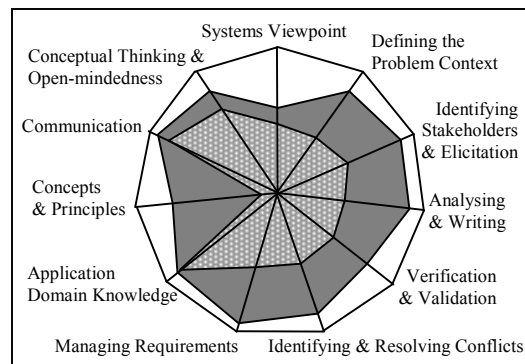


Figure 1: Illustrating the change in capability

### 5. Conclusions

*'If you can't measure it, you can't manage it'*

By carrying out the REVEAL<sup>®</sup> Competency and Assessment scheme, we enable an organisation to baseline their requirements engineering capabilities for each individual, and for the organisation as a whole. This has the following benefits:

**Individual:** identify training needs.

**Change Agent:** monitor progress over time.

**Project:** monitor capability and assess any over-reliance on key individuals.

**Organisation:** identify wider training issues and measure skills for future deployment.

### 6. References

- [1] IEE/HSE Guidelines Safety, Competency And Commitment – Competency Guidelines For Safety-Related System Practitioners. ISBN 0 85296 787 X, 2000.