

An Instrument for Measuring the Maturity of Requirements Engineering Process

Mahmood Niazi

National ICT Australia, Sydney, NSW 1430, Australia
Mahmood.niazi@nicta.com.au

Abstract. Requirements problems are widely acknowledged to have impact on the effectiveness of the software development process. In order to improve the requirements engineering (RE) process and to reduce requirements problems, Sommerville et al. [1] have developed a requirements maturity model. Literature shows that the measurement process, designed in this model, is very confused and can lead organizations to incorrect results. This is because the measurement process is ambiguous and no strategic and systematic approach is used to decide different scores for various RE practices.

The objective of this paper is to propose a measurement instrument for Sommerville et al.'s model to effectively measure the maturity of the RE process. The main purpose of proposing this measurement instrument is to develop better ways to assist practitioners in effectively measuring the maturity of the RE process. This instrument provides a very practical structure with which to measure the maturity of the RE process. I have tested this instrument in one case study where only one category of RE process, i.e. 'requirements elicitation' was used as an exemplar. The case study results show that the measurement instrument has potential to assist practitioners in effectively measuring the maturity of 'requirements elicitation' category of the RE process. Thus, I recommend organizations trial this instrument for other categories of RE process in order to further evaluate its effectiveness in the domain of RE process.

1 Introduction

Requirements problems are widely acknowledged to have impact on the effectiveness of the software development process [2; 3]. Many software projects have failed because they contained a poor set of requirements [4]. No software process can keep delivery times, costs and product quality under control if the requirements are poorly defined and managed [5]. In order to produce software that closely matches the needs of an organisation and the stakeholders, great attention needs to be paid to improvement of the RE process [5; 6].

In order to improve the RE process and to reduce requirements problems, some researchers have published their work [1; 5]. Sommerville et al.'s model is derived from existing standards and has three levels of maturity: Level 1-Initial, Level 2-repeatable and Level 3-Defined. The model can be used to assess the current RE

process and it provides a template for requirements engineering practice assessment. It is based upon 66 good requirements practices which are classified into Basic, Intermediate and Advanced. Against each practice, four types of assessments are made: 3 points are scored for standardized practice, 2 for normal use, 1 for discretionary use and 0 for practices that are never used. This model classifies organizations with less than 55 points in the basic guidelines as Level 1-Initial, organizations with above 55 points in the basic guidelines and less than 40 points in the intermediate and the advanced guidelines as Level 2-Repeatable and organizations with more than 85 points in the basic guidelines and more than 40 points in the intermediate and advanced guidelines as Level 3-Defined.

In earlier work, in order to use the Sommerville et al. maturity model, the author has conducted an empirical study with Australian practitioners [7]. This study was a two-fold process; firstly, requirements process maturity was assessed using the requirements maturity model developed by Sommerville et al. and secondly, the types and number of problems faced by different practitioners during their software project was documented. In this study the interviews were conducted with twenty-two Australian practitioners. During interviews the practitioners had the opinion that although all the practices, in Sommerville et al. maturity model, are very well defined, the measurement process designed for these practices was very confused and could lead organizations to incorrect results. This is because the measurement process is ambiguous and no strategic and systematic approach is used to decide different scores for various practices. The practitioners in this study were very happy with the list of practices for RE process but they wanted more formal and structured measurement instrument in order to assess the maturity of the RE process. Somerville et al. have also indicated this: “this assessment scheme is not a precise instrument and is not intended for formal accreditation” [1:p29].

I have developed an instrument in order to effectively measure the maturity of the RE process. The objective of this paper is to describe this measurement instrument and to test this instrument in one case study.

To focus this study, I investigated the following research question:

RQ. Does the proposed measurement instrument help practitioners measure the maturity of their RE processes?

The main reason for addressing this research question is to develop better ways in order to assist practitioners in effectively measuring the maturity of the RE process.

This paper is organised as follows. Section 2 provides background. Section 3 describes the development process of an assessment instrument. In Section 4 the assessment instrument is described. In Section 5 a case study is presented. Finally the paper presents a summary of conclusions and recommendations for practitioners as concluding remarks.

2 Background

RE is often considered an important process of the software life-cycle. This is because software industry and research communities have realised the difficulties of producing high quality requirements [8]. It has been observed through RE literature that one can achieve better quality requirements if the RE process is properly defined