

# Chapter 81

## Critical Issues in Requirements Engineering Education

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### ABSTRACT

*Requirements Engineering (RE) is the most crucial process within software development projects. In order to prepare skilled requirements engineers, Requirements Engineering Education (REE) needs to be provided to students at the university level before they become software engineers and part of the work-force. However, RE is considered the most difficult subject within the software engineering curriculum for students to learn and for lecturers to teach due to its uncertain nature. This chapter examines the current and potential areas for research within REE. It first presents the current status of REE provided in universities and the REE problems reported in the literature that lead us to the potential research problems in REE. The REE teaching approaches proposed by researchers are then elaborated. The proposed approaches are mapped back to address the REE problems. The chapter closes with recommended directions for future REE research.*

### 1. INTRODUCTION

Requirements Engineering (RE) process is perceived as one of the most critical activities within software development projects because many projects fail due to RE problems. RE is about capturing the requirements of customers and analysing, modelling and validating those requirements and presenting them in a software requirements specification, which is the final output within the RE process. The software is then developed based on these specified requirements.

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Failure to identify these requirements accurately will result in failure to meet the project goals and satisfy the customers. Hence, ensuring effective RE process is a great challenge not only to the software industries but also to the academic world who is responsible for educating future requirements engineers. In order to prepare skilled requirements engineers, Requirements Engineering Education (REE) needs to be provided to students at university level before they become software developers and part of the workforce (Berenbach, 2005).

The purpose of REE is to teach students the relevant concepts and skills that they need to perform RE, as well as enabling them to practise performing RE activities while working on software development projects. Unfortunately, in most computer science or software engineering programmes, RE topics is not given a high priority and most programmes only allocate a small amount of credit hours to it. On top of that, due to its uncertain nature, students are only exposed to its theoretical concepts and lack practice. Additionally, lecturers may find the subject challenging to teach, specifically in finding the best way to prepare students for the RE activities within limited resources. Moreover, a requirements engineer's job is not an alluring job like a project manager or an architect's; this job is sometimes considered as dead-end and boring. In spite of all these drawbacks, RE is a vital part of software development life cycle (Berenbach, 2005). Due to the lack of RE topics in most academic programmes, software developers have to learn the RE activities during the job (Jiang, Eberlein, & Far, 2005). This circumstance makes most software developers lacking in RE skills and knowledge.

Besides that, current Software Engineering programmes still utilize the traditional methods of teaching basic RE concepts of processes, models and methodologies. Unfortunately, through typical lectures, students may not be able to learn the skills that the industry requires (Beatty & Agouridas, 2007). REE should be aimed at achieving the industrial relevance so that students will be able to cope with large scale software development projects, and the challenges and proven techniques related to industrial development of software (Wohlin & Regnell, 1999).

Even though there is an increasing emphasis on RE in university curriculum for undergraduate as well as postgraduate students, only very few published work on improving the teaching of RE (Callele & Makaroff, 2006) has been visible. The most important challenge in REE is to equip students with sufficient skills to perform RE activities within the limited time and resources available at learning institutions (Yusop, Mehboob, & Zowghi, 2007). In order to meet that challenge, it is imperative to identify an enhanced pedagogical approach to incorporate a learner-centred design in the development of curriculum and instructional strategies, to develop a general and flexible curriculum framework along with the supporting materials, and to exploit new technologies for on-campus learning (Adroin, 2000).

This chapter highlights the current status of REE problems and proposes a list of suggestions for future research in REE. The chapter starts with a general overview of RE and REE, and then presents the REE offered at different universities and the recommended RE model curriculum and teaching strategies (in Section 2). Section 3 highlights the potential research problems in REE, while Section 4 presents the proposed pedagogical approaches that can be used to address the REE problems. In Section 5, a list of suggestions is proposed that highlights the future directions of REE research. Section 6 concludes the chapter.

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