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Three Major Instructional Approaches for Requirements Engineering

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Three Major Instructional Approaches for Requirements Engineering

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Abstract: In this talk, we report on our findings from the paper *A Survey of Instructional Approaches in the Requirements Engineering Education Literature* [DGT21], which has been accepted at and published in the proceedings of the *2021 IEEE International Conference on Requirements Engineering*. The paper reports the findings of a systematic literature review to define and investigate the current state of research on requirements engineering education.

Keywords: Requirements Engineering Education; Systematic Literature Review

1 Introduction

Requirements engineering has established as a software engineering discipline and as important part of software engineering curricula. Therefore, an effort has been made to shape this discipline, establish the need to consider requirements engineering a vital part of software engineering studies, and to define the important core of requirements engineering every software engineer needs to understand during their studies (cf. [Gl21]). Due to the diverse and theory-heavy nature of requirements engineering, it poses major challenges for the learner and the instructor alike. To lay a foundation for a common instructional toolkit, we conducted a systematic literature review and investigated the requirements engineering education literature.

2 Findings

We included 152 primary studies from 1988 to 2020. Analysis allowed us to define best practices and current trends to provide guidance for requirements engineering instructors. Results indicate a steady increase in requirements engineering education literature, especially for the last couple of years. Most contributions are solution proposals and evidence is mostly

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presented in the form of experience reports, indicating overall low maturity of the field. We identified three recurring themes specific to instructional approaches in the requirements engineering education literature. These are:

1. Requirements engineering education approaches often use "project-based learning and team collaboration" to make students ready for solving requirements engineering problems on their own and to enable students working in collaborative manner.

2. Teaching "soft-skill development through real and realistic stakeholder involvement" is an important topic as students need to understand the significance of personal communication to elicit, negotiate, and validate requirements with stakeholders.

3. "Gamification and simluation" are used in requirements engineering education to make teaching materials more interesting and inspiring for students.

Comparing our findings with the idea of Mary Shaw to specialize requirements engineering education already in undergraduate software engineering curricula [Sh00], we conclude that a sizable proportion of the instructional approaches proposed after 2008 that we surveyed were targeted at undergraduate learners, and trained them for the role of "requirements engineer". However, we also found out that Shaw's aspiration for flexible yet robust pedagogical approaches and curricula remains unsatisfied. We only found very few studies dealing with how to instruct requirements consistency, traceability, safety, and security. Moreover, requirements engineering education presently suffers from a lack of a common pedagogical basis. In addition, while a plethora of successful and effective techniques are proposed, more thorough empirical investigations are still needed.

3   Data Availability

The identified publications as well as their mapping and classification are available as data set at doi.org/10.35482/csc.003.2021.

Literaturverzeichnis

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