

The Eye of Continuous Software Engineering

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Abstract: We summarize the paper *Practitioners' Eye on Continuous Software Engineering: An Interview Study* [Jo18], which was presented at the 2018 edition of the *International Conference on Software and System Processes (ICSSP)* in Gothenburg, Sweden.

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1 Overview

Practitioners increasingly apply Continuous Software Engineering (CSE), i. e., combining activities such as continuous integration and deployment, to enable rapid software development [Bo14]. However, practitioners have different perceptions of CSE, which impedes its adoption in industry. Challenges in introducing CSE to real-world environments and improving activities as well as the lack of comparisons with other companies to identify risks and benefits hinder the adoption of CSE. We aim to support practitioners in establishing, assessing, and advancing CSE by providing an overview of current practices in industry.

We derived a list of CSE characteristics that distinguishes between *CSE categories* and *CSE elements*. This list served as the foundation for a semi-structured interview and was refined based on practitioners' answers: We completed the study with nine CSE categories: user, developer, business, development, operation, code, quality, software management, and knowledge. Each category encompasses two to four CSE elements; 33 elements in total.

We conducted the interview study with 24 practitioners from 17 companies. The practitioners were composed of developers, technical leaders, CSE specialists, project managers, and an executive director. All of them are primarily using, defining, or planning CSE. As outlined in Section 2, our research questions focused on practitioners' definition of CSE, elements perceived as most relevant, experiences, and future plans for CSE. We used a questionnaire and a guideline to run the interviews with the practitioners and audio-recorded their answers. We applied a two-step approach for the analysis of the transcripts. First, we allocated answers to research questions. Second, we coded text extracts with the CSE elements.

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2 Results

How do practitioners define CSE? Practitioners primarily use CSE elements from the software management category, i. e., continuous integration of work, agile practices, and continuous deployment of releases, to define CSE. Overall, *tool, methodology, developer, life cycle*, and *product management* perspectives formed practitioners' definitions of CSE.

Which CSE elements are perceived as most relevant by practitioners? CSE elements from three categories were repeatedly mentioned by practitioners when being asked for relevance: quality, i. e., *automated tests*, user, i. e., *involved users and other stakeholders*, and developer, i. e., to *comply with a shared ruleset*. Notably, developers consider CSE elements from the *code* category as the base for CSE. The results for this research question can be summarized under *user commitment, team commitment, and automated loop*.

What are practitioners' experiences with CSE? We recorded 19 positive, 56 neutral, and 17 negative experiences with CSE elements. Categories in which positive experiences prevail indicate CSE elements that might serve as an entry point to CSE. Few positive mentions might signalize the low maturity of the respective CSE elements. In case practitioners are currently evaluating a CSE element, they might tend to provide neutral responses given their work-in-progress state. Multiple negative experiences can reveal CSE elements that are challenging to implement for practitioners. We provide experience reports for the CSE categories *developer, operation, software management, user, and quality*.

What are practitioners' future plans for CSE? Practitioners' reports are vague and mostly span over multiple CSE categories. They mention 19 CSE elements either only once, twice, or three times. With seven mentions, *automated tests* stood out from the other CSE elements. Practitioners' main strategies focus on *enhancement, expansion, and on-demand adaption*.

From the practitioners' answers, we conclude that some elements of CSE remain difficult to implement. Therefore, we created the *Eye of CSE* model. As depicted in [Jo18], the pupil of the eye is focused on CSE, while the CSE categories form the iris and thereby determine the perception of CSE. The CSE elements are arranged throughout the *sclera*, the white of the eye, and are loosely coupled with one category; their proximity to other elements indicates similarities and relationships to them. This structure helps to identify next steps for CSE.

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References

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