

Making Pull Requests Evaluation A Good Experience

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- Introduction:
 - The Pull Requests (PR) evaluation process can have an important impact on contributor's motivation, so it is important to understand the factors affecting evaluation. The outcome of an evaluation is reaching further than just whether the contribution is accepted. It impacts the motivation of a new contributor to contribute again.
- The study:
 - To investigate this topic, we asked contributors and maintainers to show us examples of pull requests evaluated fairly and unfairly in their opinion, and to justify why they have identified the selected PRs as either fair or unfair. We performed a qualitative analysis of the comments and the PR discussions. Eight qualities emerged as determinants of a good experience in pull requests evaluation. When these practices are integrated into a PR evaluation, the process is deemed fair by contributors. When they are missing or violated, the evaluation is considered unfair.

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- Method:
 - We collected the data through a survey. We asked the respondents to provide two cases of pull requests, one where they felt the pull request was assessed fairly, and one evaluated unfairly. In both cases, we asked for justification. We received a total of N=101 cases.
 - We selected eight communities for this study, ROS, FOSSASIA, Coala, Plone, Apache Spark project, OpenSUSE, Linux Kernel, and OpenGenus. These are well established open, and growing communities.

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- Results:
 - We identified a set of eight good practices for pull request evaluations. When these practices are integrated into a PR evaluation, the process is deemed fair by contributors. These practices are:
 - Engagement
 - Communication
 - Appropriateness
 - Simplicity
 - Compliance
 - Support
 - Honest decision, and
 - Meeting the community quality requirements
 - We discuss these practices in the next slides.

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- Results:
 - Engagement
 - This practice was designated as important by our respondents; it is the involvement of the community with the contribution. A respondent writes: "The community showed interest in the PR. More than three reviewers and the maintainers reviewed the PR. This was really motivating." Engagement acknowledges the contributor's effort and motivates her/him. This is a behavior that indicated the community is willing to participate and become involved in the review and evaluation of the proposed contribution.
 - Communication
 - The style of communication adopted by the participants in the PR evaluation is critical to the success of the evaluation process. This participant explains: "The tone of the conversation was constructive. In the end, improvements were made to the software." It is advisable to keep the discussion technical. This behavior refers to the exchange and sharing of information and feedback during the PR review. Our participants have preference for constructive and corrective feedback using a balanced language.

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- Results:
 - Appropriateness
 - The suitability of the contribution to the community vision for the product. Contributed features must meet the needs and plans of the community. Appropriateness is explained in a comment by a respondent who states: ``The changes suggested were necessary. We obviously, don't like unicorn features! We like to invest our energy in something that adds value. As soon as the code quality and correctness were good, it got merged and got appreciated.''
 - Simplicity
 - Contributions should have the quality of being free from complexity and intricacy. This practice is well supported in the PRs we examined, and in the comments left by our respondents. This participant stated, ``the history is messy because of the number of times it was rejected, but it was fairly rejected, which resulted in a more modular, better-tested code than the initial commit.''

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- Results:
 - Compliance
 - The adherence to the community programming language guidelines and architectural principles. Following best practices enhances the chances of a PR being accepted. One respondent explains: ``This PR was following good practices, was reviewed by two contributors where one of them was main project maintainer. And it got merged.''
 - Support
 - This is the material and emotional assistance that the community provides to the contributors during the evaluation process of the PR. A material assistance is a substantial support delivered in the form of corrective feedback with a constructive and professional language. One respondent stated: ``Even though I was unable to understand and follow the guidelines, the maintainers helped me ...'' Another participant in the survey describes support with this comment, ``the contributor was guided through steps to make the code better and more useful than what have been initially created. The code was reviewed and put to the test.'' Support does not only enhance team cohesion, but also helps to elevate the quality of the submission.

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- Results:
 - Honest decision
 - This is fairness in decision-making to merge the PR which means that the process for making the decision is fair and free from bias. It is also based on factual and technical grounds. Unfair decisions are a common experience in FOSS communities as well. We observed from our data that contributors expect a logical decision based on technical merits.
 - Meeting the community quality requirements
 - Meeting the quality requirements is fundamental to the studied communities. Each PR is scrutinized for quality. When the ``quality" of the contribution was acceptable, then, our participants enthusiastically claim that the PR was fairly assessed. This participant stated: ``Great support for the community to get the PR quality aligned to the community requirements and meet other standards." Another participant describes a fairly assessed PR saying: ``A good quality code with a plenty of reviews."

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- Results:
 - Table below illustrates the distribution of responsibilities across the stakeholders. The top row is the involved stakeholders in the PR evaluation process. The first column is the list of our identified eight good practices. a Tick in a cell of the table is an indication that the corresponding stakeholder has a responsibility to act in accordance to the practice.

Good Practices	Contributor	Maintainer	Community
Engagement			✓
Communication	✓	✓	✓
Appropriateness	✓		
Simplicity	✓		
Compliance	✓		
Support			✓
Decision		✓	
Meeting the quality requirements	✓	✓	✓

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- The End:
 - I'd like to thank those who participated in the survey and I hope you find these recommendations insightful. Thanks to my collaborators [Professor Andrzej Wasowski](#) and Associate Prof. Marisa Cohen.
 - If the community wants to discuss these findings further and their implications, then I'm happy to contribute.
- Next:
 - I would like to invite community contributors and maintainers to participate in our next study. We would like to understand the role of Bots in open source software ecosystems. E.g. How can we use Bots in the PR process? What is the perception of Bots in general in open source communities? Etc. Eventually, I will share the results with the community. Please, get in touch adaa@itu.dk