The challenges of finding peer reviewers: insights from our product design research

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Finding good peer reviewers is a difficult task. In Decentralized Science[1] project we are designing and developing a tool to improve the quality, fairness and reliability of academic peer reviewing. Our approach relies in opening peer review [1], giving transparency to the peer reviewing process using decentralized technologies such as Blockchain. During our ongoing product design research we gained interesting insights about the peer reviewing selection process, and how editors currently deal with it. Our research methods are oriented towards the development of a software tool. We use Lean Design and Agile development principles, favoring fast iterative learning over the precision and completeness of more formal approaches. This contribution shares what we learned in the process about how editors deal with peer reviewer selection: from their needs and complains to their tricks, including some of their confessions. It also explains how we embraced this insights to improve our current prototype design.

1 Research

This section introduces the product oriented design research we conducted to refine our knowledge about the peer reviewing process, as well as some of the insights we gain from this exploration. It starts introducing and contextualizing the origin and purpose of the work (Section 1.1), continues presenting how we focus the initial research on the editors' role (Section 1.2), presents the problems of peer reviewing from their perspective (Section 1.3), and finishes presenting the exploration of the proposed solutions (Section 1.4).

1.1 Point of departure

Our research start as an effort to find a "Minimum Viable Product" for Decentralized Science, a proposal to build a decentralized peer reviewing and publishing infrastructure, where articles and peer review reports can be publicly shared [2][3]. The project aimed to improve the quality, reliability and fairness

[1] https://decentralized.science

of academic peer reviewing for authors, reviewers and editors. Its approach consist in bringing transparency to the peer reviewing process using decentralized technologies such as Blockchain and IPFS.

The initial research already included a survey that explored the importance of some problems from the viewpoints of authors, reviewers and editors. However, it only provided an overall perspective of this problems and lacked qualitative information to refine these problems, and better understand how to solve them.

1.2 Framing the research

Our proposal aims to help authors, reviewers and journal editors. However, it is difficult to design a solution having in mind such diversity of actors in the initial design phases. Thus, this initial product research focuses on the journal editors' role. Therefore, important issues that our tool also aim to target, such as improving the recognition of peer reviewers or reducing the prices of open access publishing [4][5], are outside the scope of this study.

1.3 Discovering the problems

As suggested by the Lean Startup methodology introduced by [6], we conducted a series of "problem interviews" to start understanding our customers (i.e. the journal editors). In this interviews, our purpose was to identify the important problems of our customers, and learn how they currently deal with them.

We performed 19 problem interviews [6, 7] answered by 12 people (as some of them replied the interviews from different roles). These interviews gave us information about 5 journals, 6 conferences, 3 academic associations, 4 reviewers and 1 university press.

From these interviews we identified that the following were the most important problems for editors in the peer reviewing process (as they appeared with more frequency than other issues):

- Finding peer reviewers
- Get reviewers acceptance
- Reviewers' response time
- Quality of peer reviewing

We also found strategies that editors use to solve these issues despite not having easier tools. This contributes to find this problems important for them. For instance, to deal with bad quality reviews and slow reviewers, a conference organizer shared that they have a black list of reviewers, while to get reviewers to accept the invitations a journal editor shared that in order to get an acceptance, he should send at least ten invitations.

These findings were used to design our first prototype, that helped us continuing our research as explored in the following subsection.

1.4 Exploring the solutions

To address the identified problems (shared in previous section) we developed an initial Value Proposition [8], with three main functionalities:

1. **A specialized search for reviewers**: editors can search for reviewers
2. **Reviewers' reliability metrics**: the results of the search of reviewers include statistics about how often they reply on time.
3. **Transparent Peer Review processes**: the system encourages the publication of review reports (open peer review). These review reports can be shared among different journals.

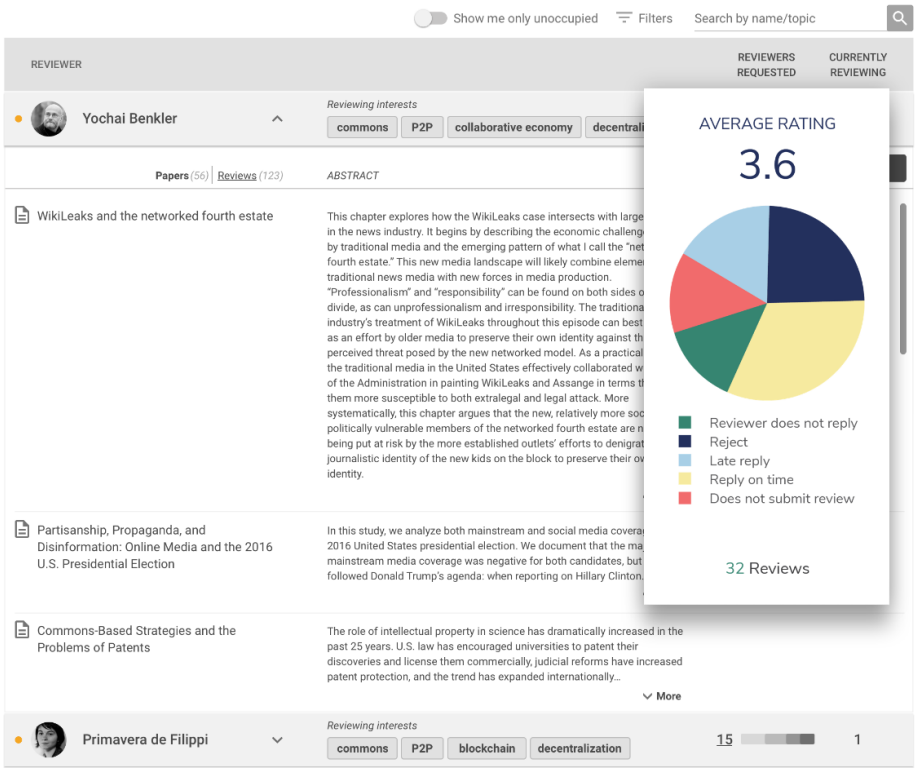

Fig. 1. Detail of the first version of the prototype Mock-up.

These functionalities were incorporated in a Mock-up prototype (Figure 1). It represents a search within a network of reviewers, with reputation metrics of reviewers that show their quality, and reliability. Thus, the system aims to provide a way for editors to find good reviewers.

This prototype has been tested within pilot projects by different customers. The development is following agile methodologies [9], gradually improving the

proposal in short cycles (iterations) with customer participation. In these sessions, customer tested our prototypes. We learned from their reactions and feedback many relevant insights, such as what is important for them when they are searching a reviewer from the feature requests we received:

- Include reviewer's acceptance ratio statistics: It is important to know if a reviewer is especially strict.
- Include reviewer's h-index: The experience of the reviewer is an important factor.
- List also external reviewers: The journals' pool of reviewers is often not enough to find reviewers.
- Get automatic recommendations of reviewers: It is a costly process to find reviewers.

2 Results

As we learn from the recurrent solution interviews explained in previous section, we are developing a functional prototype, available under a Free Software license online[2]. The software is developed as an extension to existing peer reviewing software such as Open Journal Systems [10]. Interestingly, most of the needed information is already in the system, however it is not visible from the available interfaces. Thus, we can provide useful tools to journal editors using the information they already have. Additionally, our proposal aim to openly publish peer review reports, using decentralized technologies such as Blokchain and IPFS to provide transparency and Open Access. As some journals are already requesting, our tool will be able to offer information from peer reviewers of different journals, facilitating the search for the best and more reliable reviewers.

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[2] https://github.com/DecentralizedScience/Prototype

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