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Open source scientific publishing platform for the future

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Open source scientific publishing

platform for the future

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IV. Introduction

Scientific publishing platforms and the traditional peer review process have been criticized for taking too much time to publish a paper, for lacking of reliability, for being too expensive, or even for creating biases. These criticisms can concern several differing levels, such as the work of peer reviewers, or editorial decisions that can affect peer review.

Delay and expense might be the main criticism about the publishing process. Indeed, the period starting from the submission of the paper to the actual publication can often last one year or even more. During this period, the most time-consuming task is related to peer reviewing. Delays may happen and then the availability of results for further research and professional exploitation is slowed down (Ross-Hellauer, 2017). The cost of the work that has been done during this period is also expensive, with the global costs of reviewers' time estimated at £1.9bn in 2008 (Research Information Network [RIN], 2008).

Unreliability and inconsistency is another criticism and is related to decisions about the acceptance or rejection of papers. Peters and Ceci, in 1982, have made a study and found out that 66% of papers were rejected for methodological defects when they were resubmitted to journals where the author had already been published. This inconsistency is reflected in peer review's failure to prevent errors and fraud from penetrating the scientific literature.

Peer reviewing can also be subject to social biases such as gender, nationality, language and institutional affiliation, as well as publication biases such as the preference for complexity over simplicity in the methodology and language (Ross-Hellauer, 2017).

The last criticism is related to the lack of incentives for reviewers in a traditional peer review process. Indeed, reviewers' work is almost exclusively unpaid and their anonymous contributions can't be recognized or rewarded (Ross-Hellauer, 2017).

In this thesis will first be described different types of peer review process in order to understand if some type(s) can address issues listed above. In a second part, all features provided by scientific publishing platforms will be detailed and explained to see which features should be included in a future open source scientific publishing platform.

V. Scientific publishing platform

1. Definition

Elsevier, Springer, Wiley-Blackwell, Taylor&Francis, Sage Publications are the main players on the scientific publishing market and account for more than 50% of published journal output (Larivière et al., 2015). Those publishers own scientific publishing platforms such as ScienceDirect, Nature, Wiley Online Library, etc. and those platforms are defined as databases containing journals in which researchers submit their papers (Forgues & Liarte, 2013).

There are two different types of journals: on the one hand, closed access journals which means accessing the content of papers by the mean of a subscription, and on the other hand, open access journals which means that everyone with an internet connection can access the content of papers (Fialaa & Diamandis, 2017).

2. Publishing process

2.1. Introduction

Since the 20th century, the publishing process has been the same. Authors submit their article to a scientific journal, and then the editor sends it to some people who are experts in the field. These people are called “reviewers” and their role in the publishing process is to carefully read the paper, check the quality of the research and the results, and look for the respect of ethical or scientific standards. Afterwards, reviewers send a report to the editor detailing if the paper should be published, published but revised, or rejected (Fialaa & Diamandis, 2017). The review step is highly important in the publishing process because it allows to have an objective and unbiased point of view that will give a constructive feedback to the authors of the article reviewed.

2.2. Detailed process

The process presented in Figure 1 includes all possible steps that can happen during the publication process of a paper. The very first step of the process is an initial check by the editor (often the editor-in-chief) in order to determine the quality and values of the manuscript, and its relevance to the journal. The manuscript might already be rejected at this step. If the paper succeeds to this step, then it is checked again by an editorial assistant, who will verify that the manuscript

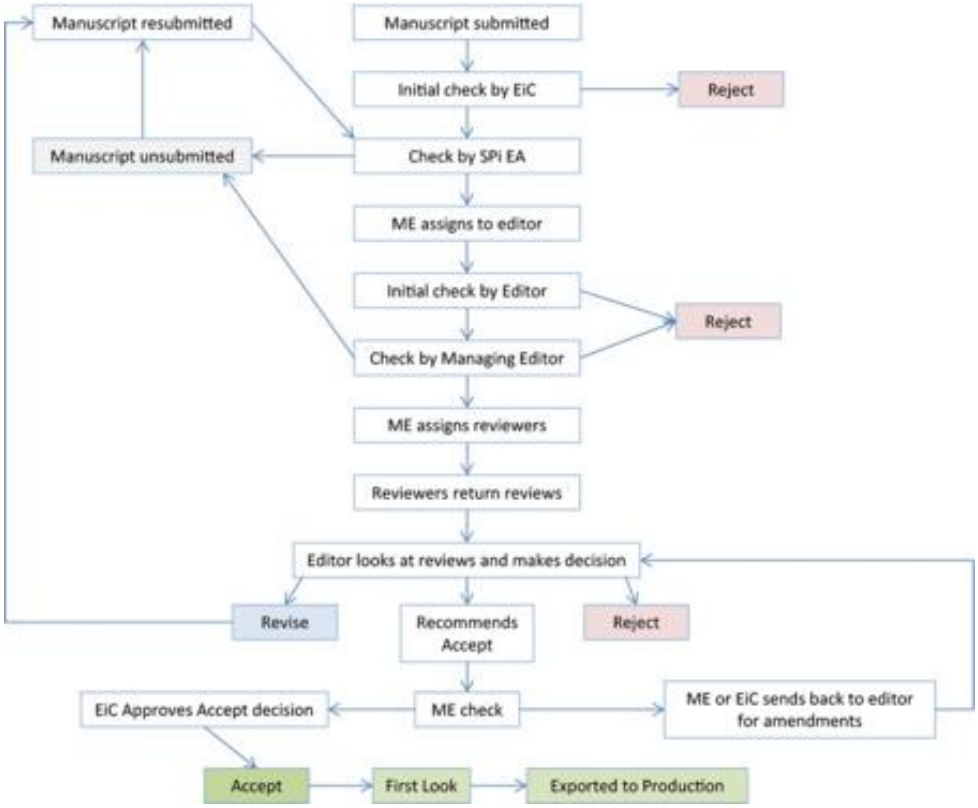


Figure 1. The editorial process, including peer review. EiC, editor-in-chief; EA, editorial assistant (SPi is a company providing editorial assistants); ME, managing editor.
Source: Ali & Watson, 2016.

is not similar to other sources using tools like iThenticate, for example. If the manuscript is too similar to existing papers, it may be sent back to the author for modifications. Once the manuscript is resubmitted, the managing editor assigns the manuscript to an editor and the latter performs additional checks like the readability or the conformity to the standards of the journal. Again, the manuscript might be rejected or sent back to the author for modifications. Once the manuscript fits all previous criteria, the managing editor assigns two to three reviewers to the manuscript. Reviewers are people with a certain expertise and knowledge in the selected field in order to give feedback on the quality and accuracy of the manuscript, and if the paper is worth publishing. The editor then has a look at reviews and takes the decision to reject, send back for revision, or accept the manuscript. When the paper is sent back for revision, reviewers suggest changes or ask for further explanations. Once modifications have been done, the manuscript is accepted and goes to the last stage of the publication process, which is called production and ensures the production of

a readable and comprehensible article free of spelling mistakes, and presented in the uniform style of a particular journal (Jefferson et al. 2007). The author is also expected to check and approve the final proof before the final stage which is an administrative process, to ensure the allocation of appropriate tracking number, called Digital Object Identifier (DOI), to the article and regular production of a journal (Jefferson et al. 2007). The peer review process is important to understand, not only for potential authors, but also for those involved in the process, as it is often an individual/solitary exercise (Ali & Watson, 2016).

3. General characteristics

	ScienceDirect	Nature	Wiley Online Library	Taylor & Francis Online	Oxford University Press	SpringerOpen	Frontiers	Public Library of Science	MDPI	ResearchGate
Commercial	V	V	V	V	V	X	X	X	X	X
Open source	X	X	X	X	X	V	V	V	V	V
Open access possibility	V	V	V	V	V	V	V	V	V	V
Copyright retained	V - Creative Commons Attribution (CC-BY-NC-ND)	V - Creative Commons Attribution (CC-BY)	V (depends on the journal chosen)	V - Creative Commons Attribution (CC-BY, CC-BY-NC, CC-BY-NC-ND)	V - Creative Commons Attribution (CC-BY, CC-BY-NC, CC-BY-NC-ND)	V - Creative Commons Attribution (CC-BY)	V - Creative Commons Attribution (CC-BY)	V - Creative Commons Attribution (CC-BY)	V - Creative Commons Attribution (CC-BY)	By publishing on ResearchGate, scientists don't transfer copyright to the platform.
Free PDF download	V (open access)	V (open access)	V (open access)	V (open access)	V (open access)	V	V	V	V	V
Peer reviewing	V	V	V	V	V	V	V	V	V	V
Publication fees	$0-5200	$1100-5200	$1500-5200	$2950	Not found	$625-2500	$0-2950	$1495-2900	$0-1900	Not found

Table 1. General characteristics of the scientific publishing platforms

3.1. Open Access

"Open Access, in the context of scholarly publishing, is a term widely used to refer to unrestricted online access to articles published in scholarly journals" (Laakso et al., 2011). Two different ways of obtaining open accessibility to scientific research have been identified: Gold Open Access and Green Open Access.

3.1.1. Gold Open Access

Gold Open Access is defined by Laakso et al. as "a form of Open Access where the document is made available by the publisher to whom the document has been submitted". The final published version of an article is made accessible immediate and permanent via the publisher's website to anyone, free of charge, as soon as it is published (G. Akterian, 2017). The Gold Open Access category covers different types of publications, from small journals publishing few articles per year to big journals publishing hundreds of articles in the same period of time (Laakso et al., 2011). Gold Open Access can be divided in different subcategories based on the degree of content availability. The first subcategory is Direct Open Access and refers to a whole journal published without any limitations. This type of Open Access accounts for 62% of Gold Open Access (Björk et al., 2010). The second subcategory is Delayed Open Access and this type of journals provides the most recent content only to paying subscribers, while non-paying subscribers can only access the content after the embargo period. This type of Open Access accounts for 14% of Gold Open Access (Björk et al., 2010). The 24% remaining refer to Hybrid Open Access, which is when authors or the author's institution pay to make a an article freely available in a subscription-based journal (Björk et al., 2010).

3.1.2. Green Open Access

In a Green Open Access platform, the author delivers a self-archiving version of the article he/she wrote in a repository where readers can access it online and without paying. It can be done by uploading the article to the homepage of the author, or to his/her institutional repository. The version of the manuscript can be the manuscript submitted to the journal, a pre-print of the manuscript accepted to be published in the scientific journal, or the published paper itself (Laakso et al., 2011). After an embargo period has expired, the author can put the accepted manuscript

directly in an institutional repository and make it available for the public. “The embargo is a period of time set by the publisher in the copyright transfer agreement with the authors. Typical embargo periods vary from 6 to 24 months, though some publishers may require an embargo of Open access publishing up to 48 months. The embargo periods of Elsevier journals are in the range from 6 to 36 months. The embargo period is 12 months for scientific, technical, medical, and psychology journals of Wiley publisher and 24 months for social science and humanities journals of this publisher” (G. Akterian, 2017).

4. Peer review process

4.1. Definition

“Peer review is a process of evolution in order to publish for scholarly community. Peer reviewer is also called referee and articles are called “refereed articles”. According to WAME (World Association of Medical Editors), a peer-reviewed biomedical journal is one that regularly obtains advice on individual manuscripts from reviewers who are not part of the journal’s editorial staff to intend to improve the accuracy, clarity, and completeness of published manuscripts and to help editors to decide to publish. Peer review is the “golden standard” for evaluating the publications. Editors request at least two reviewers to evaluate a manuscript. Sometimes journals call an additional review. Additional peer reviewer is needed for cross disciplines, statistical analyses, complex, controversy or strong disagreement work for thorough evaluation of a paper” (Lasker, 2018).

4.2. Types of peer review

4.2.1. Single-blind peer review

Tomkinsa, Zhang and Heavlin (2017) define single-blind peer reviewing as the practice of making reviewers aware of author identity when deciding to accept or reject the document for review, but authors don’t know who the reviewers are. This type of review is the most common one because it allows reviewers to take decisions objectively, without being influenced by the author. Another advantage is that reviewers can use their anonymity in order to justify their very critical comments when reviewing an author’s work.

4.2.2. Double-blind peer review

In the opposite, in double-blind peer reviewing, neither party is aware of the identity of the other (Tomkinsa, Zhang, & Heavlin, 2017). This type of review can be useful in order to avoid biases such as author's gender, country of origin, academic status or publications history. Another kind of bias can be the reputation of the author. Indeed, double-blind peer review allows the reviewer to be objective as he doesn't know the author's reputation, and so review the paper based on the content of the article, rather than on the author's reputation.

4.2.3. Triple-blind peer review

On top of the two first types of peer reviewing, there is triple-blind peer reviewing which means that when researchers submit their papers to a publisher, even the editor doesn't know the identity of the author and reviewer (Watson R., 2015). The aim is to minimize biases as well, but as for double-blind peer review, there is always a possibility for the reviewer or editor to recognize the author (e.g. by the style of writing, the subject matter, or even citation patterns).

4.2.4. Open peer review

Defining open peer review is a complex task as there are lots of ways to define it. The two following examples illustrate differences in the way to define it:

- "An open reviewing system would be preferable. It would be more equitable and more efficient. Knowing that they would have to defend their views before their peers should provide referees with the motivation to do a good job. Also, as a side benefit, referees would be recognized for the work they had done (at least for those papers that were published). Open peer review would also improve communication. Referees and authors could discuss difficult issues to find ways to improve a paper, rather than dismissing it. Frequently, the review itself provides useful information. Should not these contributions be shared? Interested readers should have access to the reviews of the published papers" (Armstrong, 1982).
- "Open review makes submissions OA [open access], before or after some prepublication review, and invites community comments. Some open-review journals will use those comments to decide whether to accept the article for formal publication, and others will

already have accepted the article and use the community comments to complement or carry forward the quality evaluation started by the journal" (Suber, 2012).

Several factors are already brought out of these two examples, such as removing the anonymity of authors and reviewers, publishing review reports, the possibility to interact between participants, crowdsourcing reviews, or making papers available before it has been accepted in order to get comments from the public. These factors are distinct in the problems they are targeting and the strategy presented to address openness. As an example, revealing the identity of the reviewer to the author focuses on increasing accountability and reducing biases. Indeed, according to Armstrong: "referees should be more highly motivated to do a competent and fair review if they may have to defend their views to the authors and if they will be identified with the published papers". A second example is the publication of reviews, which addresses issues of incentives as reviewers can get credit for what they reviewed, as well as problems of wastefulness as reviews can be accessed and consulted by readers. All these factors are independent from each other and can be employed separately. For example, reviews can be published but names of reviewers can be hidden, or identities of both author and reviewers can be known without publishing reviews.

In the paper "Defining and Characterizing Open Peer Review: A Review of the Literature" (Ford, 2013), the author analyzed thirty-five articles in order to give eight "common characteristics" of open peer review, including signed review, disclosed review, editor-mediated review, transparent review, crowdsourced review, prepublication review, synchronous review, and post-publication review. However, Ford's paper doesn't provide a clear definition of open peer review.

Tony Ross-Hellauer tries to give a complete definition of this concept through his paper "What is open peer review? A systematic review". According to him, "open peer review is an umbrella term for a number of overlapping ways that peer review models can be adapted in line with the aims of Open Science, including making reviewer and author identities open, publishing review reports and enabling greater participation in the peer review process. The full list of traits is:

- Open identities: Authors and reviewers are aware of each other's identity
- Open reports: Review reports are published alongside the relevant article.
- Open participation: The wider community to able to contribute to the review process.

- Open interaction: Direct reciprocal discussion between author(s) and reviewers, and/or between reviewers, is allowed and encouraged.
- Open pre-review manuscripts: Manuscripts are made immediately available (e.g., via pre-print servers like arXiv) in advance of any formal peer review procedures.
- Open final-version commenting: Review or commenting on final "version of record" publications.
- Open platforms ("decoupled review"): Review is facilitated by a different organizational entity than the venue of publication" (Ross-Hellauer, 2017).

4.2.5. Collaborative peer review

"Collaborative peer review allows authors, reviewers and editors to anonymously read each other's comments during review and discuss the paper among themselves" (ENAGO, 2018, https://www.enago.com/academy/experimenting-with-collaborative-peer-review). Elsevier did an experiment in order to find out advantages and/or disadvantages of collaborative peer review compared to traditional peer review process. The outcome of this study is that it resulted in a better review because interactive discussions between reviewers and authors allowed to clarify uncertain points and gave to authors a better understanding on how to revise their work. The only disadvantage of this type of review is that the process is longer than the classic one, and gives more work to reviewers and editors.

4.2.6. Multi-stage open peer review

"The multi-stage open peer review of ACP (Atmospheric Chemistry and Physics) is based on a two-stage process of open access publishing combined with multiple steps of peer review and interactive public discussion" (Pöschl, 2012). In Figure 1, we can see the two stages of the process. During the first stage, papers which passed a rapid pre-screening (access review) are published as "discussion papers" in the journal's discussion forum, and are then subject to interactive discussions for eight weeks. During this period, comments from reviewers (referees), authors, or even interested members of the scientific community, are published alongside the "discussion paper". These comments must be signed by readers, but it is not compulsory that reviewers sign their comments. During the second stage, papers are revised and peer reviewed using the same

process as in traditional journals (several rounds of reviews and revisions if needed) and, when the paper is accepted, it is published in the journal.

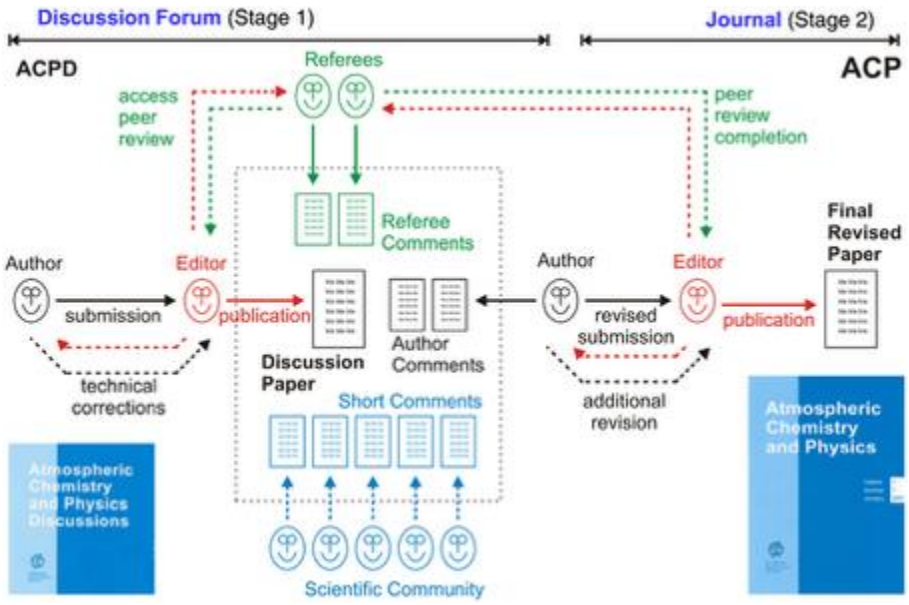


Figure 2. Multi-stage open peer review as practiced in the scientific journal Atmospheric Chemistry and Physics (ACP) and its discussion forum Atmospheric Chemistry and Physics Discussions (ACPD). Solid and dashed arrows indicate required and optional processes and interactions between author, editor, referees, and scientific community.

Source: Pöschl, 2012.

This type of peer review brings a solution to the dilemma between quick scientific exchange and full quality assurance, and offers a win-win situation to all involved members (readers/scientific community, authors, reviewers, editors, publishers) (Pöschl, 2012).

	Author advantage	Reader advantage	Reviewer advantage	Editor advantage	Publisher advantage
Discussion papers offer free speech and rapid dissemination of novel results and original opinions, without revisions that might delay or dilute innovation	X	X			
Interactive peer review and public discussion offer direct feedback and public recognition for high quality papers	X				
Interactive peer review and public discussion prevent or	X				

minimize the opportunity for hidden obstruction and plagiarism					
Interactive peer review and public discussion provide complete and citable documentation of critical comments, controversial arguments, scientific flaws, and complementary information		X	X		
Interactive peer review and public discussion reveal deficiencies and deter submissions of carelessly prepared manuscripts, thus helping to avoid/minimize the waste of time and effort for deficient submissions		X	X	X	X
Final revised papers offer a maximum of scientific information density and quality assurance achieved by full peer review (with optional anonymity of referees) and revisions based on the referees' comments plus additional comments from other interested scientists		X			

Table 2. Positive effects and advantages of multi-stage peer review compared to the traditional forms of publication with closed peer review (Pöschl, 2012).

4.2.7. Cascading peer review

"Cascading peer review is a model that avoids final rejection by redirecting peer-reviewed papers, which are rejected by one journal, to another more suitable publication" (Barroga, 2013). When a paper is rejected by a journal, either because it is of low priority for the journal at that time, or because the paper is not interesting enough for the targeted audience of the journal, the journal can recommend the author to submit its paper to a similar journal, together with the reviews that have already been done. Usually, the recommended journal is a lower-tier or a spin-off journal within the journals that the publisher manages. The advantage of this method of peer reviewing is that it reduces expenses and time allocated to multiple reviews of the same paper. Moreover, it can promote low-tier journals.

4.2.8. Post-publication peer review

Post-publication peer review (PPPR) means that the review is done once the paper has already been published. There are two kinds of PPPR: primary PPPR, and secondary PPPR. “In primary PPR, an unreviewed article is published after initial editorial checks. It can then be reviewed by formally invited reviewers. In secondary PPPR, the article is published after initial editorial checks but it is available for review by voluntary reviewers. In both cases, the article is altered by the authors on the basis of the PPPR comments and, essentially, evolves towards a published peer reviewed article” (Ali & Watson, 2016). Post-publication peer review is a complement to traditional peer review and, according to Teixeira da Silva & Dobránski (2015) “allows for the continuous improvement and strengthening of the quality of science publishing”.

5. Specific characteristics

	ScienceDirect	Nature	Wiley Online Library	Taylor & Francis Online	Oxford University Press	SpringerOpen	Frontiers	Public Library of Science	MDPI	Research Gate
Search by:										
- Title/Keyword	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- Author	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- Journal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- Article type	✓				✓			✓	✓	✓
Advanced search:										
- Sector									✓	
- Volume	✓	✓		✓	✓			✓	✓	
- Issue	✓			✓	✓				✓	
- Page	✓			✓	✓				✓	
- Abstract			✓					✓	✓	
- DOI	✓							✓	✓	
- Date	✓	✓	✓	✓	✓			✓	✓	
- Author affiliation	✓								✓	
Browse by:										
- Subject	✓	✓	✓	✓	✓			✓	✓	
- Journal A-Z		✓			✓				✓	

Refine by:										
- Date	✓	✓	✓	✓	✓			✓	✓	
- Subjects	✓		✓	✓	✓			✓	✓	
- Journals		✓	✓	✓	✓			✓	✓	
- Article types	✓	✓	✓		✓		✓	✓	✓	✓
- Country									✓	
- Author								✓		✓
- Place where keywords appear								✓		
- Open access content (or show content I have access to)			✓	✓	✓					
Sort by:										
- Relevance	✓	✓	✓	✓	✓	✓		✓	✓	
- Publication date (newest first)	✓	✓	✓	✓	✓	✓		✓	✓	
- Publication date (oldest first)		✓			✓			✓		
- Most cited								✓		
- Most viewed								✓	✓	
- Most bookmarked								✓	✓	

- Most shared								✓		
- Title			✓							
Result details:										
- Normal									✓	
- Extended									✓	
- Compact									✓	
Outline	✓			✓	✓	✓	✓	✓		✓
Date:										
- Received					✓	✓	✓	✓	✓	
- Reviewed					✓				✓	
- Accepted					✓	✓	✓	✓	✓	
- Published	✓				✓	✓	✓	✓	✓	
PDF download	✓		✓	✓	✓	✓	✓	✓	✓	✓
Browse figures			✓	✓					✓	
Metrics:										
- Views	✓			✓	✓	✓	✓	✓	✓	✓
- Downloads					✓				✓	
- Citations		✓	✓	✓	✓	✓		✓	✓	✓
- Altmetric score		✓	✓	✓	✓	✓	✓		✓	
- Saved								✓	✓	
- Discussed								✓		
	✓	✓			✓					

- Social media shares - Followers - Recommendations										✓ ✓
Share			✓	✓	✓	✓	✓	✓	✓	✓
Export citation	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Related articles	✓		✓	✓		✓	✓	✓	✓	✓
Check for updates	✓			✓		✓	✓	✓		
References	✓	✓	✓	✓	✓	✓	✓	✓		✓
Edited by							✓			
Reviewed by							✓			
Comment					✓		✓	✓		✓
Print								✓		
Abstract available	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Save search			✓	✓	✓					
Add to favorites			✓							
Term searched highlighted				✓						
Recommend										✓
Follow										✓
Claim authorship										✓

VI. Use Case

1. Online survey and analysis

An online survey has been conducted for this thesis in order to determine the importance of features provided by scientific publishing platforms. Participants were asked to assess the importance of every characteristic related to the search page, the results page, and the article page itself. Figure 3 represents the different types of participants to the survey. The majority of participants are readers (41), followed by authors (8) and reviewers (2). The scale used for the survey was a scale from 1 (not important) to 5 (very important).

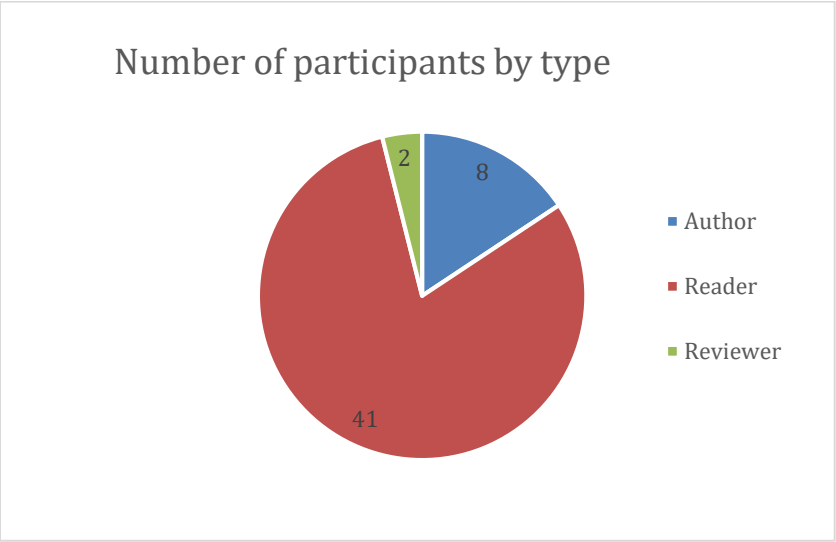


Figure 3. Types of participants to the online survey.

Figure 4 shows different features of the search page and the average score of answers of participants related to each characteristic. The possibility to search by title is definitely the preferred characteristic (4.45), followed by search by author (4.00) and browse by subject (3.61). Search by journal and search by article type got the average score, with 3.10 and 3.16 respectively, while functionalities as advanced search (volume, date, issue) (2.73) and browse by journal (A-Z) (2.37) got a score below the average.

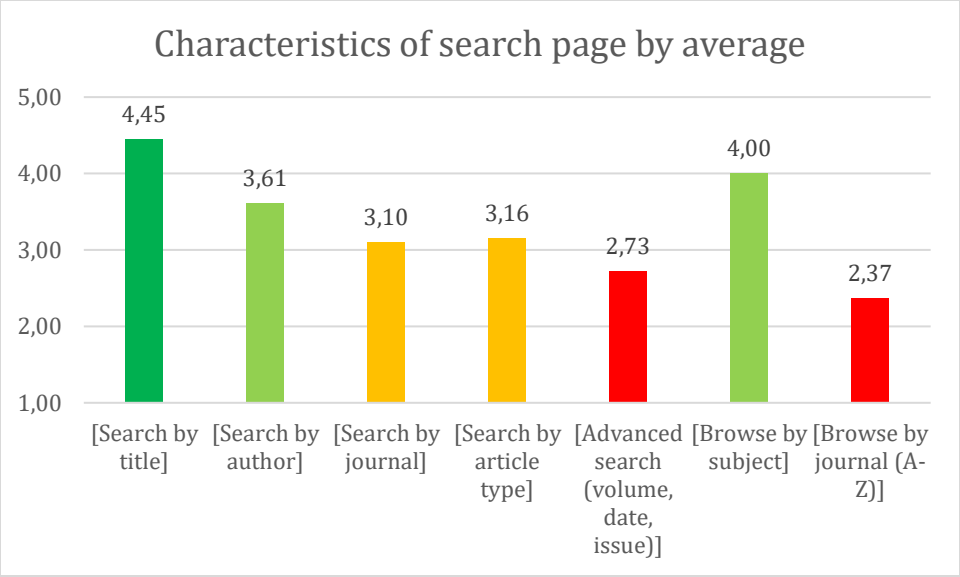


Figure 4. Characteristics of search page by average.

In Figure 5 are presented all characteristics of the results page and the average score related to it. Features as refine by subject (4.25), refine by date (4.06) and sort by relevance (4.04) are definitely "must have" functionalities, while characteristics as sort by most shared (2.69), sort by most bookmarked (2.78), sort by publication date (oldest first) (2.37), refine by place where the keywords appeared (2.94), refine by country (2.29), and refine by journals (2.94) are struggling below the average. In the opposite of the latter, some features had a good score as show abstract in the results list (3.78), sort by title (3.65), sort by most cited (3.71), and sort by publication date (newest first) (3.80). Close to the average can be found features as sort by most viewed, refine by open access content, refine by author, and refine by article types, with scores of 3.29, 3.37, 3.41 and 3.12, respectively.

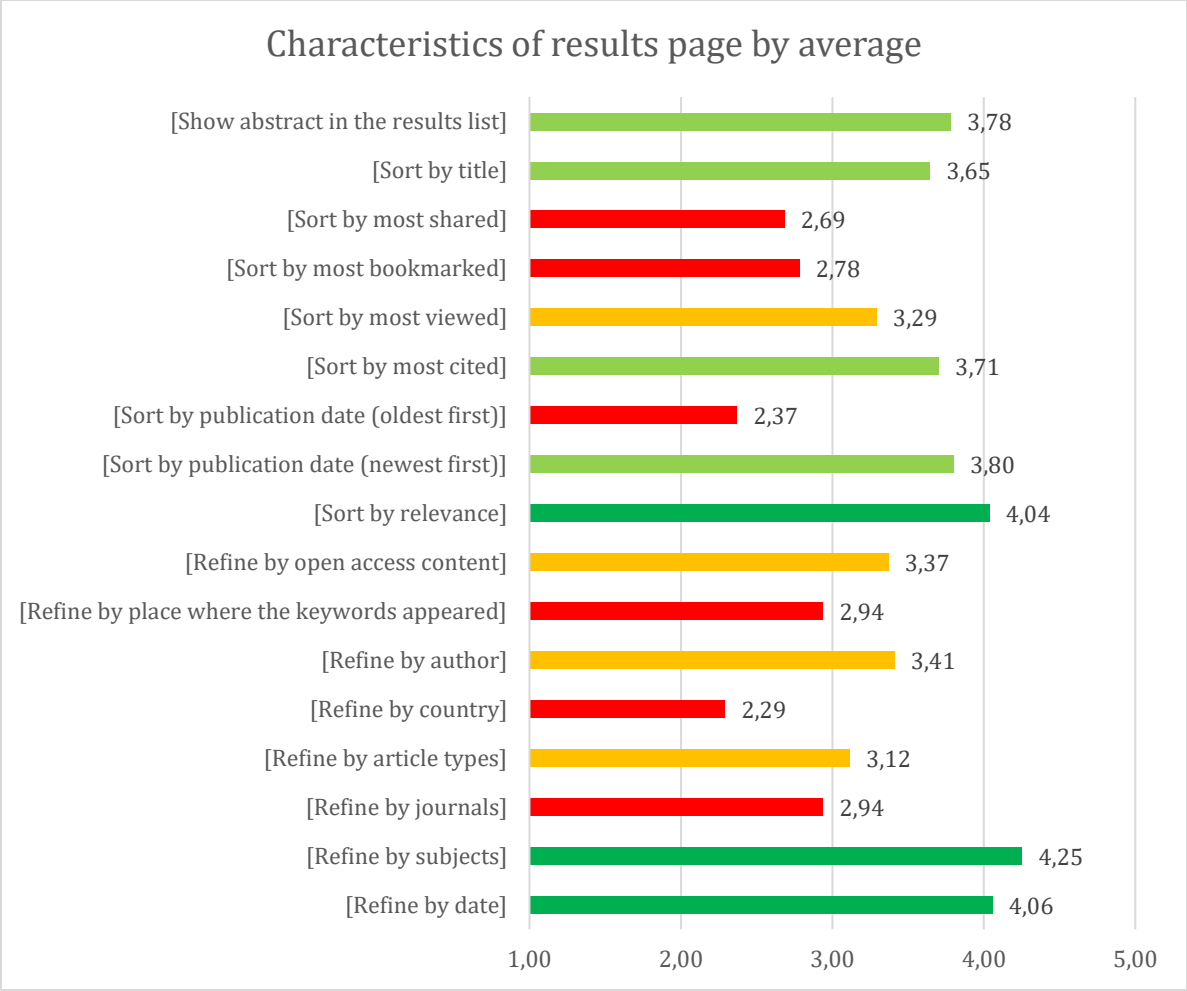


Figure 5. Characteristics of results page by average.

Average scores related to functionalities of the article page itself can be found in Figure 6. Two features received a very good average score with 4.35 for the possibility to have the abstract available even when the article isn't free, and 4.51 to be able to download the article in a PDF format. In the opposite, many features aren't that important according to participants to the survey, as claim for authorship (2.61), follow the article (2.22), recommend it (2.57), comment it (2.43), show by who the article has been reviewed (2.57), show by who the article has been edited (2.67), share the article (2.57), the date when the article has been accepted (2.57), reviewed (2.45), or received (2.47). Nevertheless, characteristics such as the possibility to show references (3.92), show related articles (3.92), browse figures (3.78), and see the date when the article has been published (3.65) received a good score.

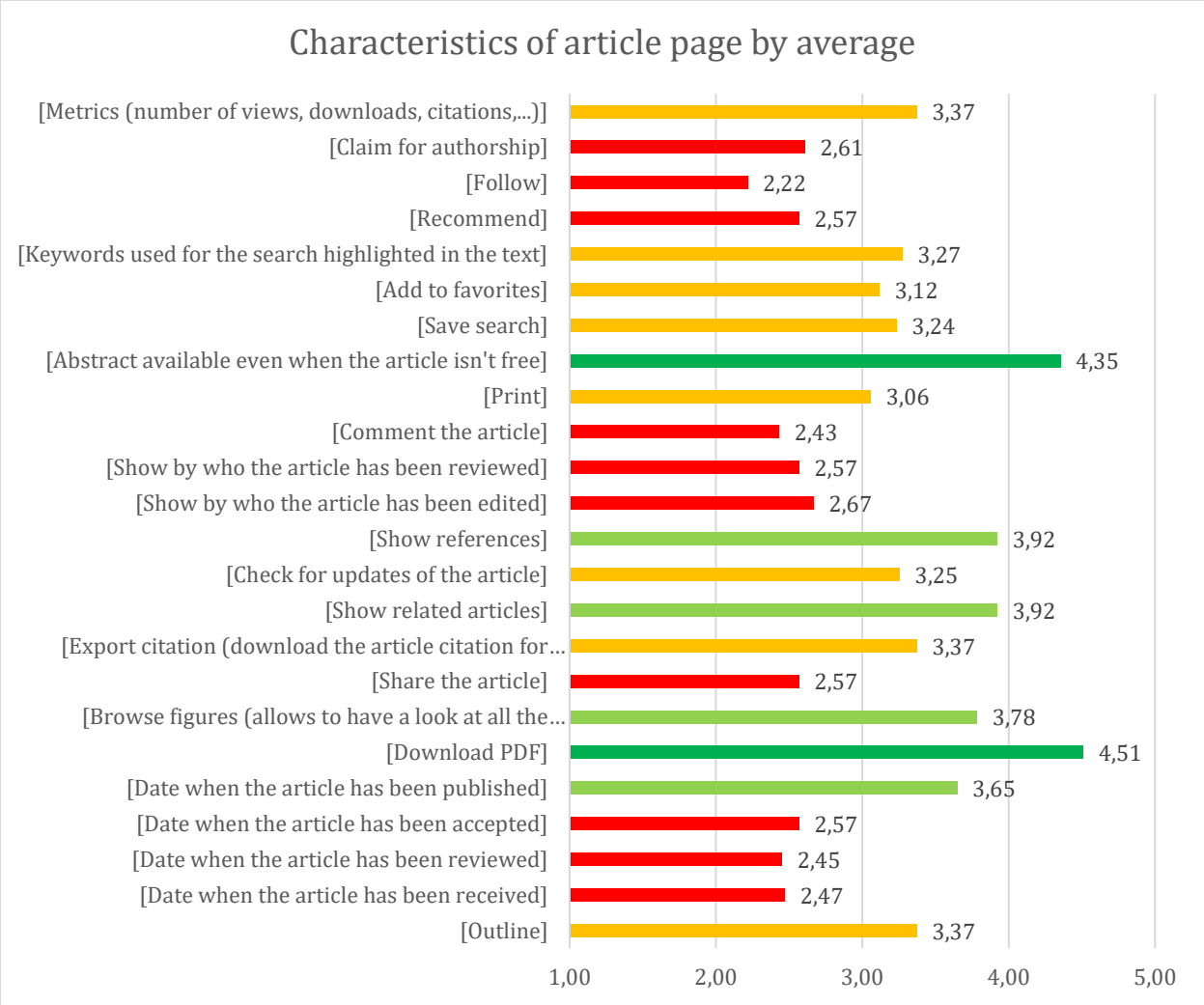


Figure 6. Characteristics of article page by average.

Table 3 provides a summary of all features sorted by the average score from the highest to the lowest. It gives a good view on which functionalities are “must have” and which ones are less important. All these features will be explained in the next chapter, except features in red which won’t be kept for a future open source scientific publishing platform.

Download PDF	4.51	Save search	3.24
Search by title	4.45	Search by article type	3.16
Abstract available when the article isn't free	4.35	Refine by article type	3.12
Refine by subjects	4.25	Add to favorites	3.12
Refine by date	4.06	Search by journal	3.10
Sort by relevance	4.04	Print	3.06
Browse by subject	4.00	Refine by place where the keywords appeared	2.94
Show references	3.92	Refine by journals	2.94
Show related articles	3.92	Sort by most bookmarked	2.78
Sort by publication date (newest first)	3.80	Advanced search (volume, date, issue)	2.73
Show abstract in the results list	3.78	Sort by most shared	2.69
Browse figures	3.78	Show by who the article has been edited	2.67
Sort by most cited	3.71	Claim for authroship	2.61
Sort by title	3.65	Recommend	2.57
Date when the article has been published	3.65	Show by who the article has been reviewed	2.57
Search by author	3.61	Share the article	2.57
Refine by author	3.41	Date when the article has been accepted	2.57
Refine by open access content	3.37	Date when the article has been received	2.47
Metrics (number of views, downloads, citations,…)	3.37	Date when the article has been reviewed	2.45
Export citation	3.37	Comment the article	2.43
Outline	3.37	Browse by journal (A-Z)	2.37
Sort by most viewed	3.29	Sort by publication date (oldest first)	2.37
Keywords used for the search highlighted in the text	3.27	Refine by country	2.29
Check for updates of the article	3.25	Follow	2.22

Table 3. Evaluation of characteristics of a scientific publishing platform.

2. Improvements

Participants to the online survey came up with several ideas to improve a scientific publishing platform, and these ideas are listed below:

- Being free for students, being able to add the article automatically in the bibliography
- Being able to add tags on selected articles in order to make a personalized thematic ranking
- Being able to open directly the article when it is cited in the text
- Being open access
- Having more free articles
- Being able to comment, having some metrics related to the article
- Having more materials such as videos, conferences

These improvements will be discussed in the next chapter.

VII. Requirements

1. Existing features

1.1. Download PDF

Being able to download the article is, without a doubt, the "must have" feature that a future open source scientific publishing platform should have. Users can simply click on a button on the article page such as the one presented right below, in order to download the article in a PDF format. Once clicked, a new window appears showing a preview of the article in PDF format. Depending on the web browser used, the user has several options available. For example, Google Chrome offers the possibility to rotate the page, download the article, or print it, while Internet Explorer allows the user to download the article, print it, send it by email, or rotate pages. For a future open source scientific publishing platform, this button should directly download the article, without opening a new window, otherwise it would overlap the feature "print article" and it is more explicit to have two different buttons.

Source: Public Library of Science

As shown in Figure 7, this feature is very important for all types of users. Indeed, being able to download the article is very useful when the user wants to keep it locally on its laptop, in order to be able to work on it, put remarks, etc.

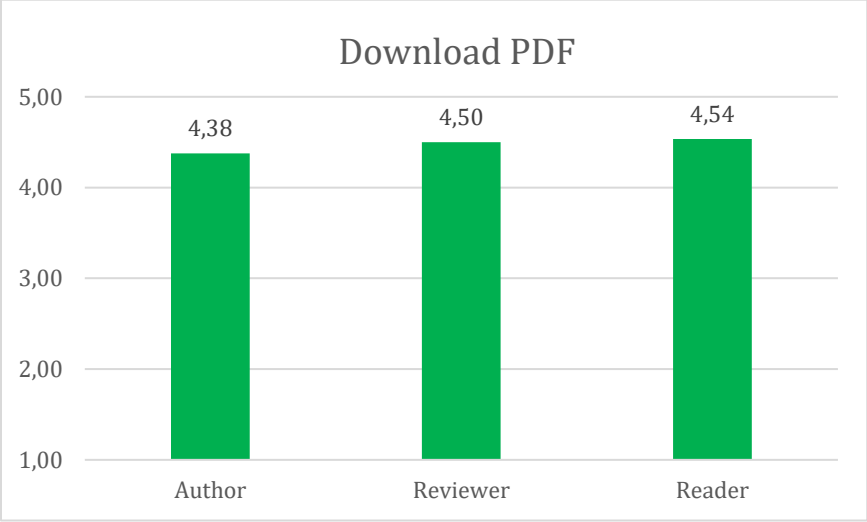


Figure 7. Average score of the feature "Download PDF".

1.2. Search by

The “Search by” feature allows users of the scientific publishing platform to search what they are looking for by offering them the possibility to search by title, author, journal or article type. This functionality is usually described as four different search bars for each search field. The result of this search is a list of the most appropriate articles. Some platforms are hiding this functionality behind a single search bar (see below) where users are able to enter keywords related to what they are looking for, and the platform looks for the most appropriate articles related to the keywords. In a future scientific publishing platform, there should be such a bar where users can write whatever they want and the algorithm behind this bar will look for the information in titles, names of authors, journals and types of article.

Source: Public Library of Science

Figure 8 represents the average score given to all different “search by” (title, author, journal and article type). Detailed graphs can be found in Appendix 1. In those graphs we can easily see that the possibility to search by title and by author are very important, while searching by journal or article type is only important for reviewers. This is the reason why it would be interesting to have a single search bar.

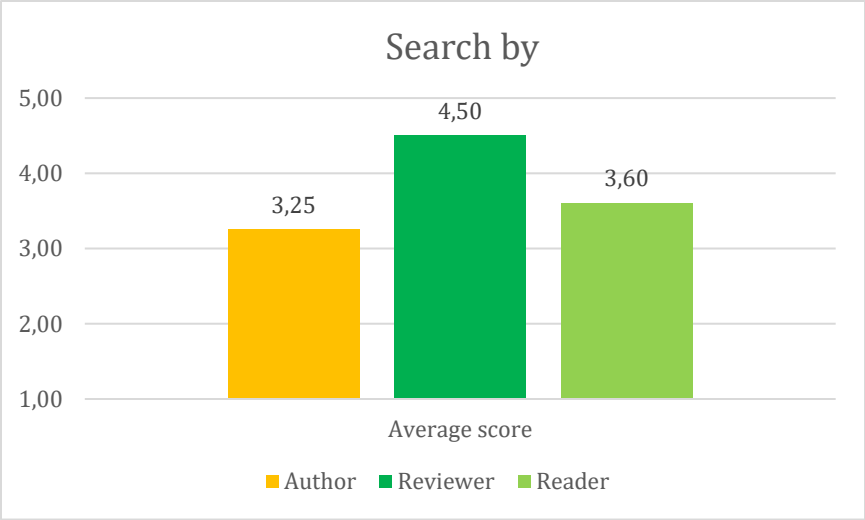


Figure 8. Average score of the feature “Search by”.

1.3. Abstract available when the article isn't free

Being able to see the abstract of the article when the latter is not free is also a must have feature of a future open source scientific publishing platform. That's the reason why every platform listed in this thesis gives this possibility to users for almost all types of articles. The abstract is a short summary of the paper (see below) and is usually shown at the beginning of the article page.

> **Abstract**
>
> Science advances through rich, scholarly discussion. More than ever before, digital tools allow us to take that dialogue online. To chart a new future for open publishing, we must consider alternatives to the core features of the legacy print publishing system, such as an access paywall and editorial selection before publication. Although journals have their strengths, the traditional approach of selecting articles before publication ("curate first, publish second") forces a focus on "getting into the right journals," which can delay dissemination of scientific work, create opportunity costs for pushing science forward, and promote undesirable behaviors among scientists and the institutions that evaluate them. We believe that a "publish first, curate second" approach with the following features would be a strong alternative: authors decide when and what to publish; peer review reports are published, either anonymously or with attribution; and curation occurs after publication, incorporating community feedback and expert judgment to select articles for target audiences and to evaluate whether scientific work has stood the test of time. These proposed changes could optimize publishing practices for the digital age, emphasizing transparency, peer-mediated improvement, and post-publication appraisal of scientific articles.

Source: Public Library of Science

As we can see in Figure 9, this feature is a very important one for authors, as well as for reviewers and readers. Indeed, this is really useful when users want to have a global idea of what the paper is discussing.

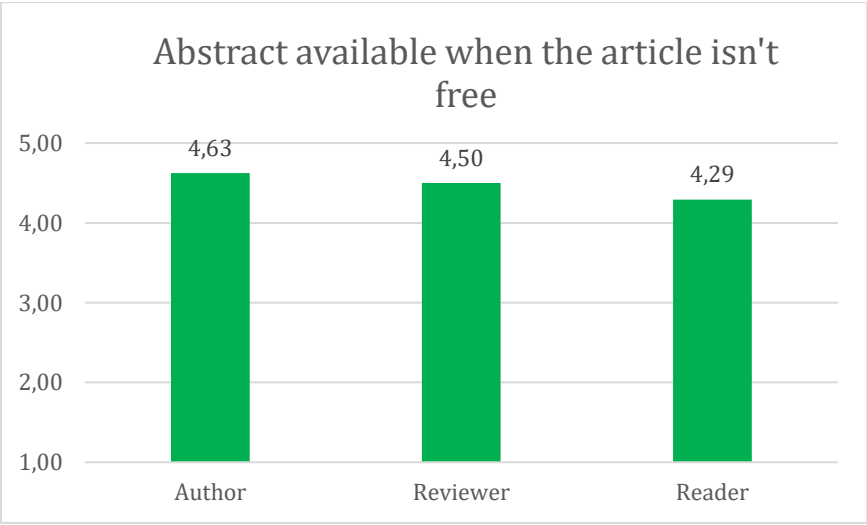
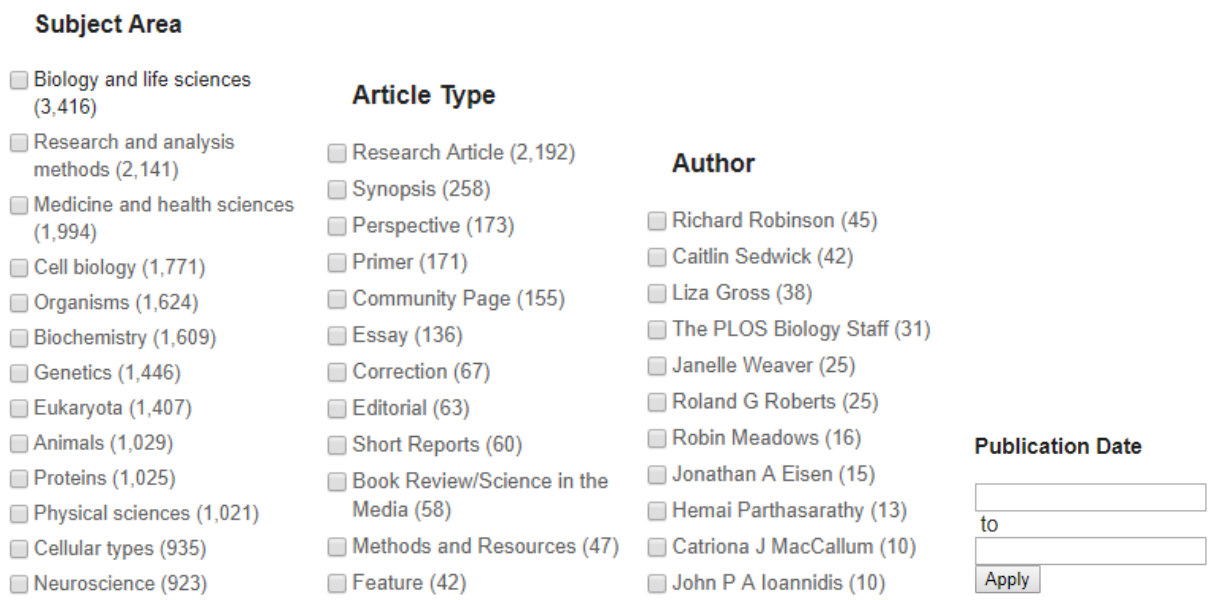


Figure 9. Average score of the feature "Abstract available when the article isn't free".

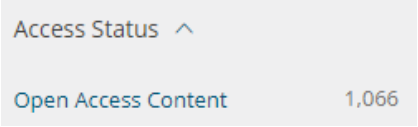
1.4. Refine by

When users press the “Search” button, a list of the most relevant results related to the subject they are looking for is offered to them (as results are sorted by relevance by default). Sometimes users want to be more precise or to reduce the amount of articles to narrow their search, so they have the possibility to refine their search by the date when the paper was published, by the subject the paper is dealing with, by the journal in which the article appeared, or even by the article type. These possibilities are the most common ones, but some platforms are going further by offering users the chance to refine by country, by author, by the place where keywords appeared when they entered their search at the very beginning, or by the content the user has access to.

According to the survey which has been conducted, a future open source scientific publishing platform should keep only the possibility to refine by subject, by article type, by author, by date, and by access status. As shown below, this feature is designed as several tables containing checkboxes where the user can tick multiple choices to narrow its search and find the most suitable article. In Appendix 2, we can see that these features are of high importance for reviewers, while, for example, authors and readers give more importance to “refine by date” or “refine by subject”.



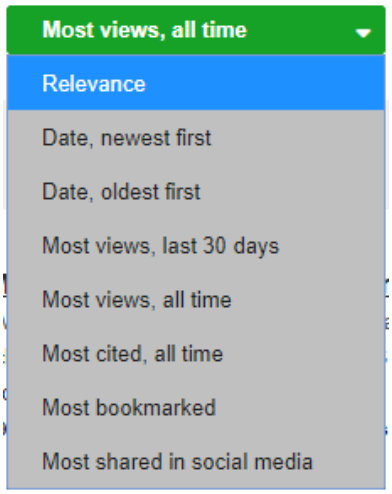
Source: Public Library of Science



Source: Wiley Online Library

1.5. Sort by

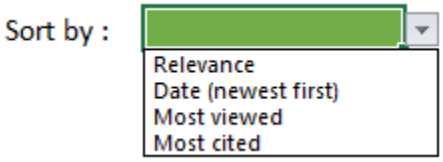
Almost every scientific publishing platform offers the possibility to sort the results of the initial search by putting the most relevant results first, by showing either the newest publications first, or the oldest, or by listing the titles in alphabetical order. Some platforms also allow users to sort papers by the most cited ones, the most viewed, the most bookmarked, or even the most shared. Usually this feature looks like a simple button (see below) showing a list in which the user can choose how to sort the results.



Source: Public Library of Science

According to the results of the survey (see Appendix 3), a future open source scientific publishing platform should offer the possibility for the user to sort the results by relevance, by date, by the most viewed articles, and the most cited ones.

Once the user has pressed the button “search” on the home page, the platform shows the results, which will be sorted by relevance, by default, which means that the platform will first show the results fitting the best to the words used for the search. The user is also able to sort the results by date, showing the newest articles first, by the number of views they have, or by showing first articles which have been the most cited. Such a feature should be designed as following:



1.6. Browse by subject

The “browse by subject” feature allows users to browse different subjects the scientific publishing platform is dealing with. This is often available on the home page of the platform. It is represented as a list of different subjects, and once users click on a subject, a list of articles related to that subject are shown on the page. Below is an example of how this feature should look like in a future open source scientific publishing platform.

Source: Multidisciplinary Digital Publishing Institute (MDPI)

As shown in Figure 10, reviewers and readers think this is an important feature, while authors think it can be helpful but not that important. Indeed, it is a very interesting feature for people who want to look for information about a subject, but without searching for something specific.

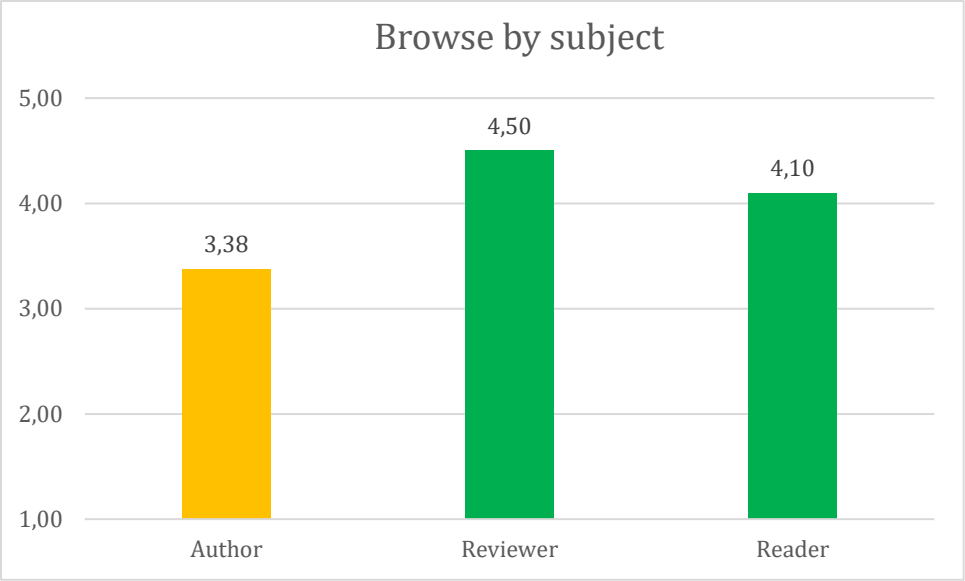


Figure 10. Average score of the feature “Browse by subject”.

1.7. Show references

Common feature included in every scientific publishing platform cited in this thesis, the ability to see the references is a very important feature for reviewers and readers, while it is less important for authors as we can see in Figure 11. References always appear at the end of the article and look like the picture below. All sources used to write the article are listed. Users can also click on a button "View article", a direct link to the article is attached to that button and allows users to open the related article in a new window. The link isn't always only related to the platform selected for the search, it might send the user to another platform. Users can also look for the article in Google Scholar, or PubMed/NCBI if it is available on that platform.

References

1. Curry S. Let's move beyond the rhetoric: it's time to change how we judge research. Nature. 2018, Feb 8; 554(7691): 147. pmid:29420505
   View Article • PubMed/NCBI • Google Scholar

2. Neylon C, Wu S. Article-Level Metrics and the Evolution of Scientific Impact. PLoS Biol. 2009:7(11): e1000242. pmid:19918558
   View Article • PubMed/NCBI • Google Scholar

3. Lariviere V, Kiermer V, J. MacCallum C, McNutt M, Patterson M, Pulverer B, Swaminathan S, Taylor S, Curry S. A simple proposal for the publication of journal citation distributions. Preprint. Available from: bioRxiv. 2016 Sept 11.
   View Article • Google Scholar

4. Kravitz D and Baker C. Toward a new model of scientific publishing: discussion and a proposal. Front Comput Neurosci. 2011 Dec 5.
   View Article • Google Scholar

Source: Public Library of Science

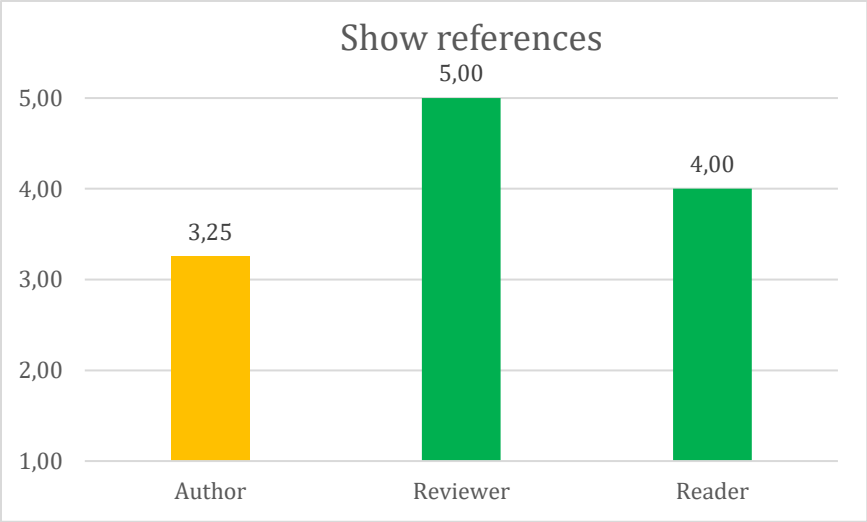


Figure 11. Average score of the feature "Show references".

1.8. Show related articles

This feature is presented as a short list of articles which are talking about the same subject as the article the user is reading. It provides a direct link to several articles in the list and usually appears at the end of the article.

Source: Public Library of Science

Figure 12 shows that this feature is very important for reviewers and authors, and a bit less for readers but still important. Indeed, it is useful when users want to gather information about a specific subject, or to see what else has been done on this subject and what other authors have done about it.

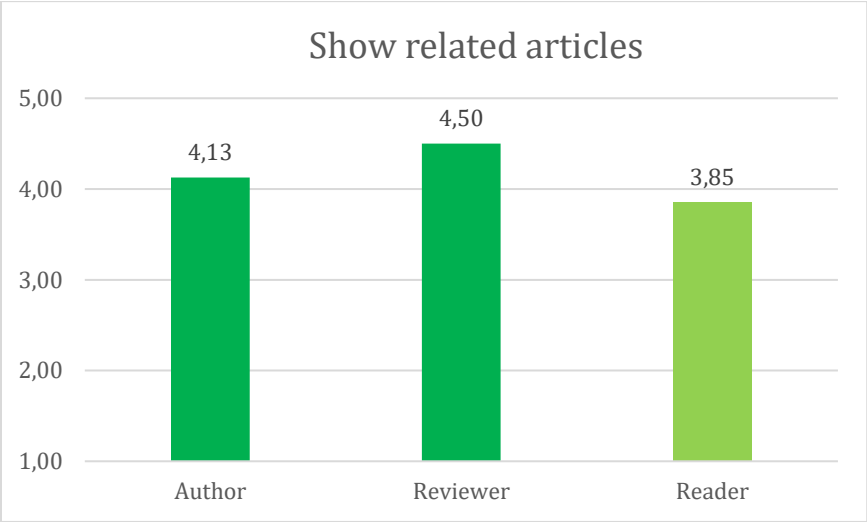


Figure 12. Average score of the feature “Show related articles”.

1.9. Show abstract in result list

On its platform, the Multidisciplinary Digital Publishing Institute (MDPI) allows users to show results in different ways. In the options offered to users (see below), there are three different possibilities to present an article in the results list: compact, normal and extended.

Source: Multidisciplinary Digital Publishing Institute (MDPI)

Once the compact presentation is chosen, then when showing the results, only the title and a few more information are shown, like the journal where the article appeared, the link of the DOI, the dates when the paper has been received, revised, accepted and published, how many people viewed or cited this article, and the possibility to download the paper directly from the search results page.

Source: Multidisciplinary Digital Publishing Institute (MDPI)

Another way to present results is the "normal" way, which provides all the information available in the "compact" version, but adds some more details like the names of the authors, a short preview of the abstract, and the ability to browse the figures presented in the article.

Open Access Editorial

Who Is (Likely) Peer-Reviewing Your Papers? A Partial Insight into the World's Top Reviewers

by Francesco Pomponi, Bernardino D'Amico and Tom Rye

Publications **2019**, *7*(1), 15; https://doi.org/10.3390/publications7010015

Received: 11 December 2018 / Revised: 7 February 2019 / Accepted: 27 February 2019 / Published: 4 March 2019

Viewed by 575 | PDF Full-text (873 KB) | HTML Full-text | XML Full-text

Abstract Scientific publishing is experiencing unprecedented growth in terms of outputs across all fields. Inevitably this creates pressure throughout the system on a number of entities. One key element is represented by peer-reviewers, whose demand increases at an even higher pace than that of [...] Read more.

▼ Figures

Figure 1

Source: Multidisciplinary Digital Publishing Institute (MDPI)

The "extended" version presents the same characteristics as the two previous versions, adding in which institute the authors are working, and allowing users to read the full abstract directly on the search results page.

Open Access Editorial

Who Is (Likely) Peer-Reviewing Your Papers? A Partial Insight into the World's Top Reviewers

by Francesco Pomponi *, Bernardino D'Amico and Tom Rye
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Publications **2019**, *7*(1), 15; https://doi.org/10.3390/publications7010015
Received: 11 December 2018 / Revised: 7 February 2019 / Accepted: 27 February 2019 / Published: 4 March 2019

▼ Abstract Viewed by 575 | PDF Full-text (873 KB) | HTML Full-text | XML Full-text

Abstract: Scientific publishing is experiencing unprecedented growth in terms of outputs across all fields. Inevitably this creates pressure throughout the system on a number of entities. One key element is represented by peer-reviewers, whose demand increases at an even higher pace than that of publications, since more than one reviewer per paper is needed and not all papers that get reviewed get published. The relatively recent Publons platform allows for unprecedented insight into the usual 'blindness' of the peer-review system. At a time where the world's top peer-reviewers are announced and celebrated, we have taken a step back in order to attempt a partial mapping of their profiles to identify trends and key dimensions of this community of 'super-reviewers'. This commentary focuses necessarily on a limited sample due to manual processing of data, which needs to be done within a single day for the type of information we seek. In investigating the numbers of performed reviews vs. academic citations, our analysis suggests that most reviews are carried out by relatively inexperienced academics. For some of these early career academics, peer-reviewing seems to be the only activity they engage with, given the high number of reviews performed (e.g., three manuscripts per day) and the lack of outputs (zero academic papers and citations in some cases). Additionally, the world's top researchers (i.e., highly-cited researchers) are understandably busy with research activities and therefore far less active in peer-reviewing. Lastly, there seems to be an uneven distribution at a national level between scientific outputs (e.g., publications) and reviews performed. Our analysis contributes to the ongoing global discourse on the health of scientific peer-review, and it raises some important questions for further discussion.

▼ Figures

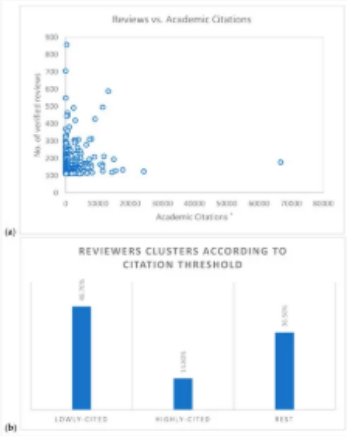


Figure 1

Source: Multidisciplinary Digital Publishing Institute (MDPI)

This feature is very important, as we can see in Figure 13, because it allows users to directly have the abstract and have an idea of what is going to be discussed in the article, without having to open the article.

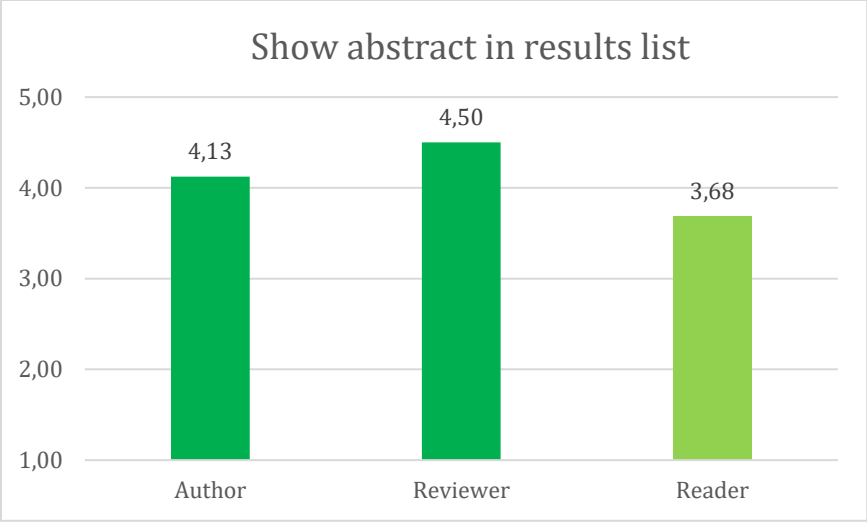
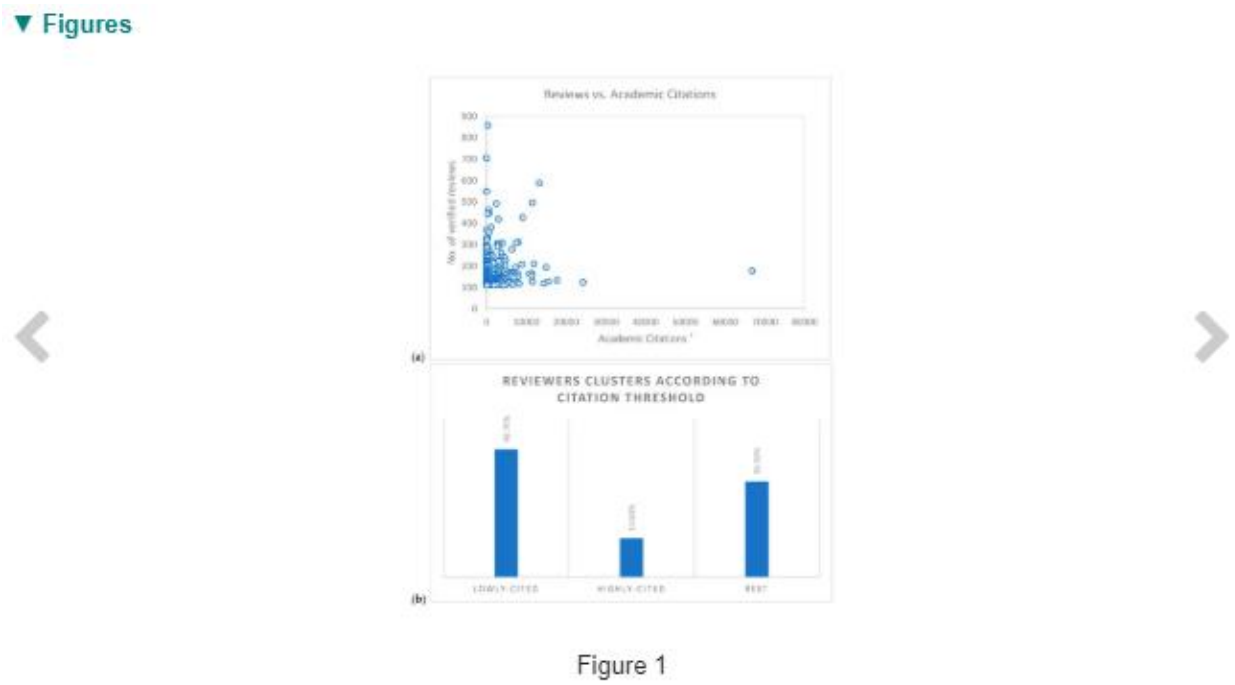


Figure 13. Average score of the feature "Show abstract in results list".

1.10. Browse figures

Some platforms already provide such a feature, which allows users to have a broad view of all the figures that are shown in the paper. The user can browse the figures using arrows, and this feature is usually shown after the abstract, so that the user has all high level information at the same place.



Source: Multidisciplinary Digital Publishing Institute (MDPI)

We can see in Figure 14 that this feature is well appreciated from reviewers and authors, a bit less from readers. A future open source scientific publishing platform should provide this feature in order for users to have a global view on what statistics and researches have been done.

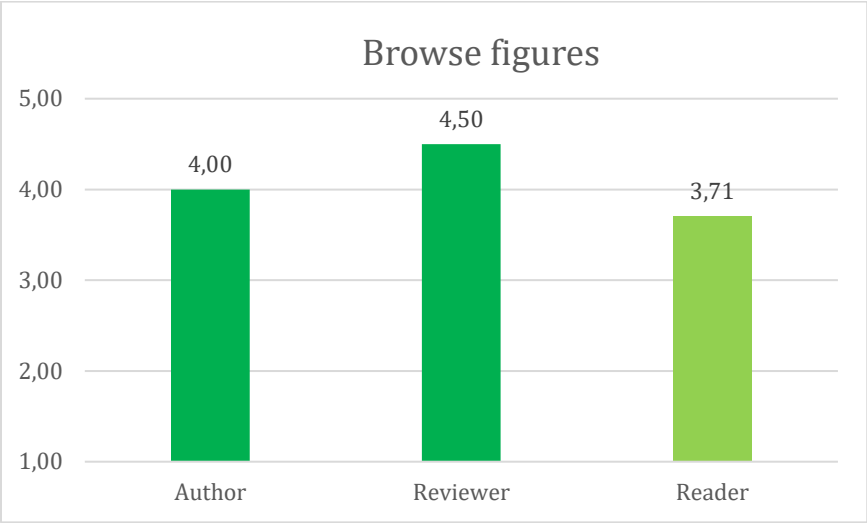
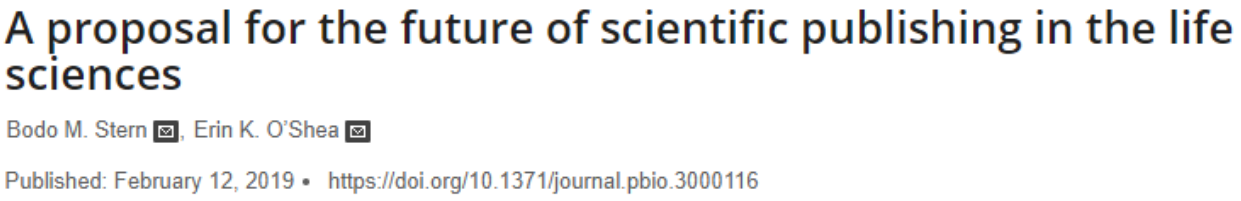


Figure 14. Average score of the feature “Browse figures”.

1.11. Date when the article has been published

Basic feature of a scientific publishing platform that every platform analyzed in this thesis is providing, the date when the article has been published is the most important date to display according to participants, compared to the date when the article has been received, reviewed, and accepted. This feature is part of the header of the article containing the title and the author(s) of the article. Below is an example of how it is displayed on the platform "Public Library of Science".



Source: Public Library of Science

In Figure 15, we can see that there is no significant difference between the types of participants to the survey, they all think it is important for them to have this information.

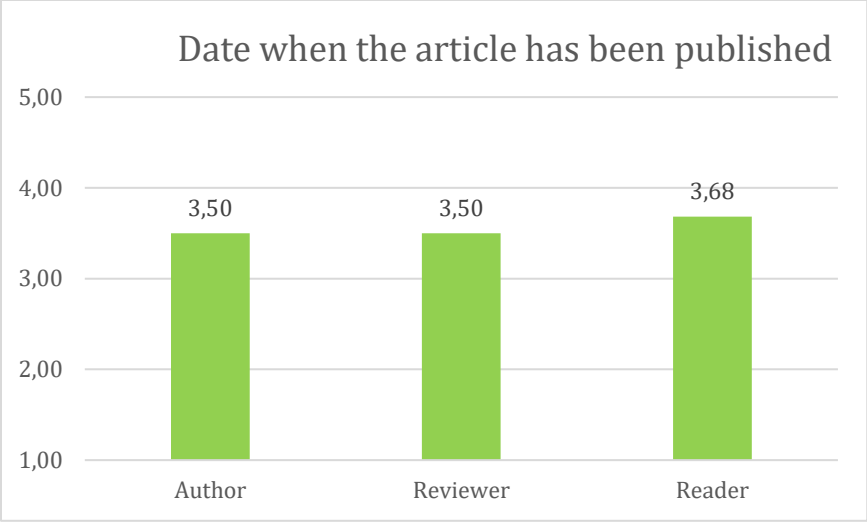
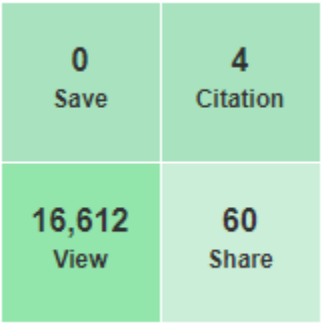


Figure 15. Average score of the feature "Date when the article has been published".

1.12. Metrics (number of views, citations, downloads, etc.)

On the article page of some platforms can be found a table containing metrics related to the article. It looks like a square (see below) divided in four boxes where the user can find different metrics, like the number of times the article has been saved, the number of times it has been cited in other articles, how many times the article has been viewed, and how many times it has been shared. This table is usually shown on the top of the article page, next to the title of the article.



Source: Public Library of Science

Figure 16 shows that this feature is more important for reviewers than for authors and readers. Being able to see metrics about the article is useful for the user who wants to have an idea of the relevance of the article he is going to read.

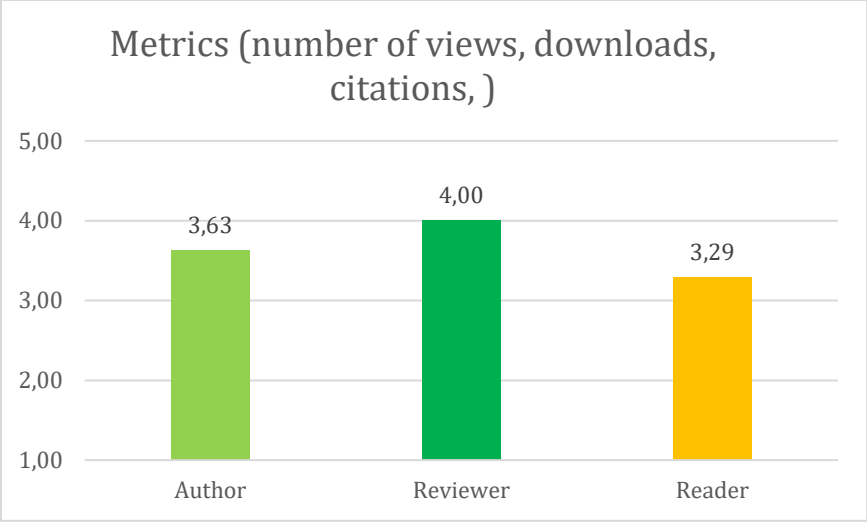


Figure 16. Average score of the feature "Metrics (number of views, downloads, citations, etc.)".

1.13. Export citation

Being able to download the citation of an article directly in the appropriate format might be the dream of everyone who is not an expert in writing citations. Below is an example of such a feature from the Public Library of Science. Once clicked, a new page appears to ask in which format the user wants to download the citation. Here the user has the choice between format RIS, which is compatible with several tools such as EndNote, Reference Manager, etc., or format BibTex, which is compatible with tools like BibDesk, LaTeX.

Source: Public Library of Science

Once the citation has been downloaded, the result looks like the following:

Citation: Stern BM, O'Shea EK (2019) A proposal for the future of scientific publishing in the life sciences. PLoS Biol 17(2): e3000116.

Source: Public Library of Science

For a future open source scientific publishing platform, there should be the possibility to choose in the drop-down menu the format in which the user wants to download the citation.

As shown in Figure 17, this features is important to very important for authors and reviewers, but of a less importance for readers. This is a very interesting functionality when users

are dealing with several articles because by clicking on the button they directly have the reference of the article in the right format.

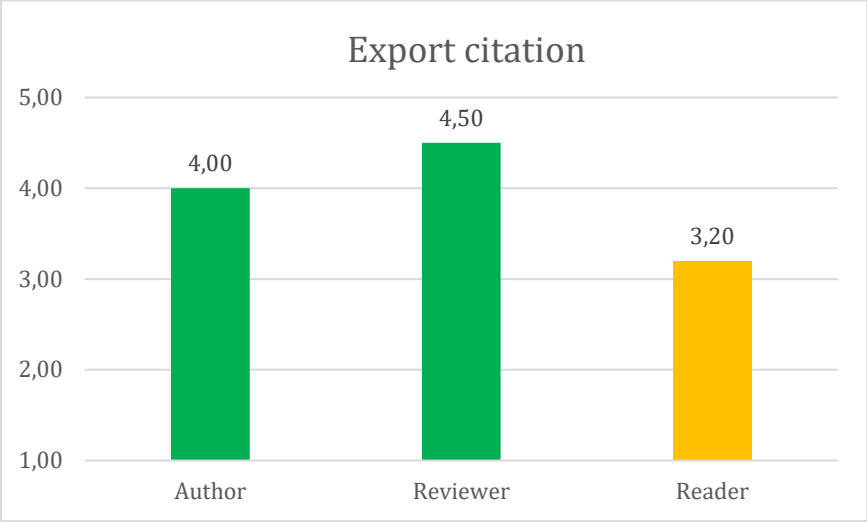
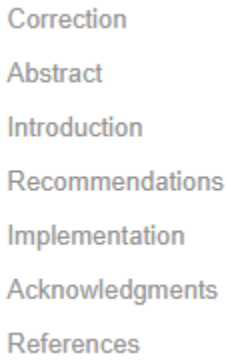


Figure 17. Average score of the feature "Export citation".

1.14. Outline

The "outline" feature is a kind of table of contents which is provided on the right or on the left of the article page in order to make the navigation in the article easier for users. By clicking on the title they are interested in, the webpage goes directly at this part of the paper. The menu has to move together with the scrolling of the text in order for the user to be able to access the outline from anywhere on the page.



Source: Public Library of Science

Figure 18 shows that reviewers appreciate this feature and think it is an important one, while authors don't seem to like this option. This is a very useful feature in order to access directly the part of the article users are interested in.

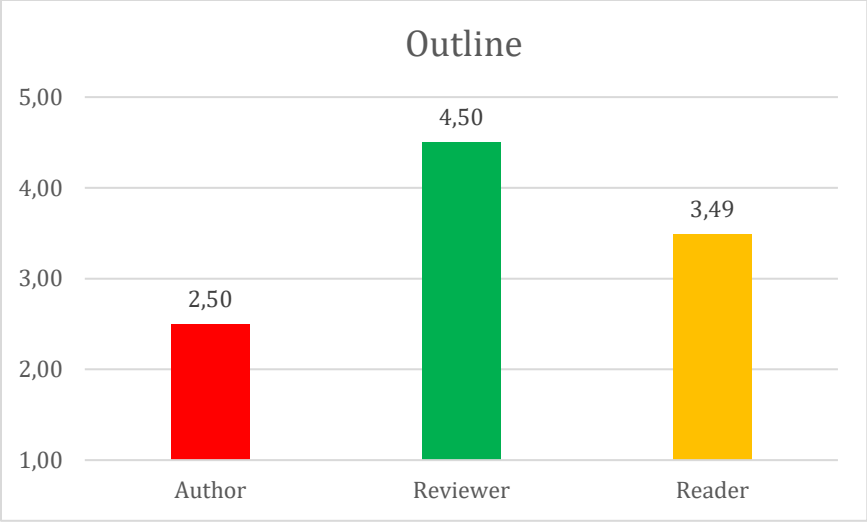


Figure 18. Average score of the feature "Outline".

1.15. Keywords used for the search highlighted in the text

This feature is not an "on-click" feature, when the user enters what he is looking for in the search bar, the scientific publishing platform gets the words and highlights them every time they appear either on the search page, on the results page, or on the article page itself. As an example, below were searched the words "scientific" and "publishing" and these words are then highlighted in the abstract of the article.

Abstract

In this paper I propose a new theoretical framework to analyse socio-technical epistemic practices and systems on the Web and beyond, and apply it to the topic of web-based scientific publishing. This framework is informed by social epistemology, science and technology studies (STS) and feminist epistemology. Its core consists of a tripartite classification of socio-technical epistemic systems based on the mechanisms of *closure* they employ to terminate socio-epistemic processes in which multiple agents are involved. In particular I distinguish three mechanisms of closure, *integration, aggregation* and *selection*, and argue that they correspond to three different types of *epistemic sociality.* Different systems can employ different mechanism of closure or combinations thereof. Yet each mechanism has its own epistemic merits, depends on specific social, technical and epistemic prerequisites, has different strengths and weaknesses, and is optimal for different epistemic tasks. The aim of my analysis is twofold. Distinguishing different modes of epistemic sociality is a way for me not only to put forward a more nuanced framework for analysing socio-epistemic practices, such as web-based scientific publishing and scholarly communication. It can also serve as the theoretical basis for improving them.

Source: Taylor and Francis Online

In Figure 19 we can see that the average score of the feature is not depending on the type of participant. Indeed, being able to see highlighted words used during the search is useful for everyone who wants to look for a specific information about a topic.

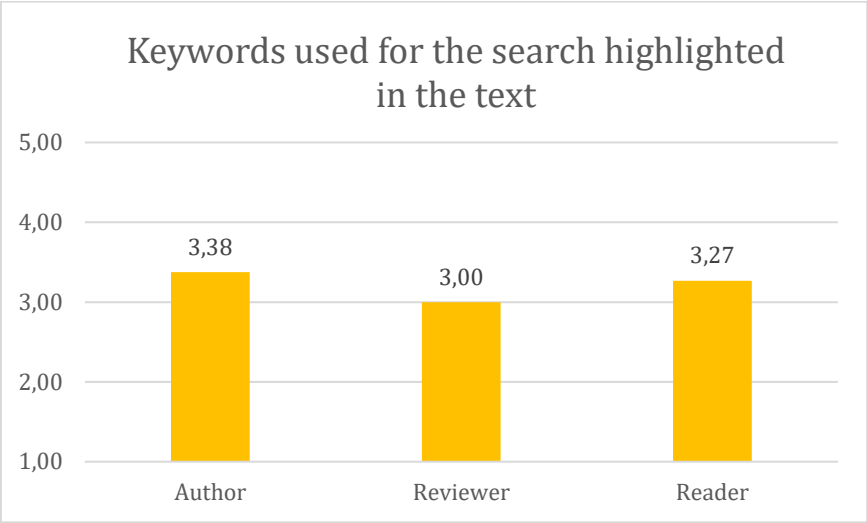


Figure 19. Average score of the feature "Keywords used for the search highlighted in the text".

1.16. Check for article updates

The aim of this feature is to check if updates of the article have been uploaded or not. This functionality is represented as a simple button (see below). Once clicked, a window appears showing information about a possible update of the article and a direct link pointing to that article.

Source: Public Library of Science

As shown in Figure 20, this feature is not that important according to the scores attributed by authors, reviewers and authors, but it can be useful sometimes to get the very last update of the article, in order to know the corrections which have been made to the article, or information added to it.

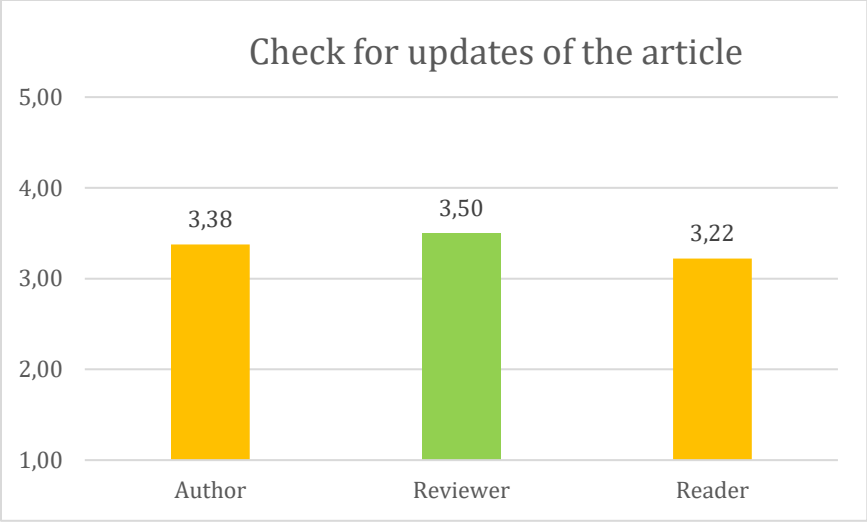
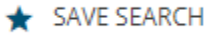


Figure 20. Average score of the feature "Check for updates of the article".

1.17. Save search

On the search results page of several existing platforms can be found a button which offers the possibility to save the search done. The idea is to be able to save searches users have done for later so that it is easy for users to find them back the next time they go on the platform. In order to be able to save the search, it is required for the user to be logged in. In other words, users need to first create an account on the platform to access this feature.



Source: Wiley Online Library

According to the survey, this feature is important especially for reviewers. The mandatory registration in order to be able to use the feature might explain why authors and readers don't find this feature really important. Indeed, occasional users of the platform might not want to register to the platform because they don't go on it often and so they don't use this feature.

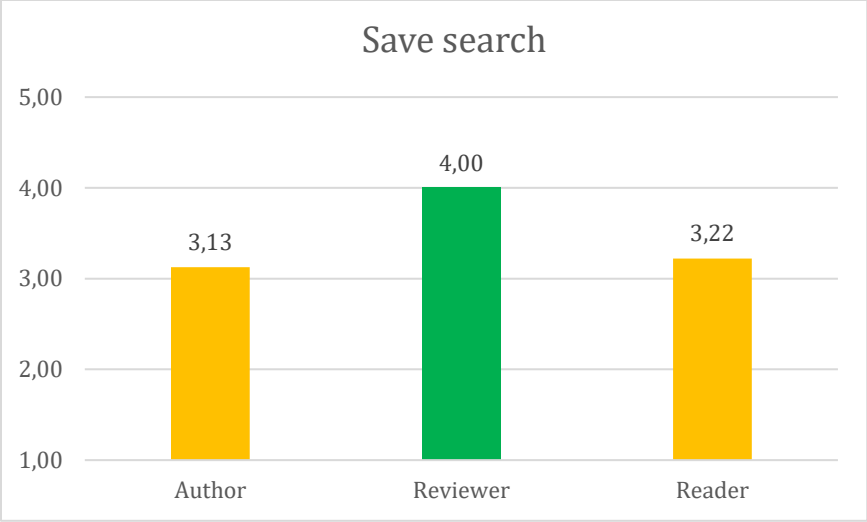
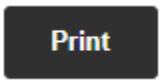


Figure 21. Average score of the feature "Save search".

1.18. Print article

The print feature is designed as a simple button on the article page. Once clicked, printing settings are shown to the user in order to select the printer, pages to print, the number of copies, the layout of pages, the text color, and even more settings such as the paper size (A3, A4, etc.), the number of pages per sheet, margins, the quality of printing, the scale, the possibility to print on the two sides of each page, keeping headers and footers, and keeping background graphics (e.g. not deleting grey background table).



Source: Public Library of Science

Figure 22 shows the average score depending on the type of participant. This feature is very important for reviewers. In the opposite, readers think it is not that important. It might be explained by the fact that readers prefer downloading articles directly and/or print them afterwards.

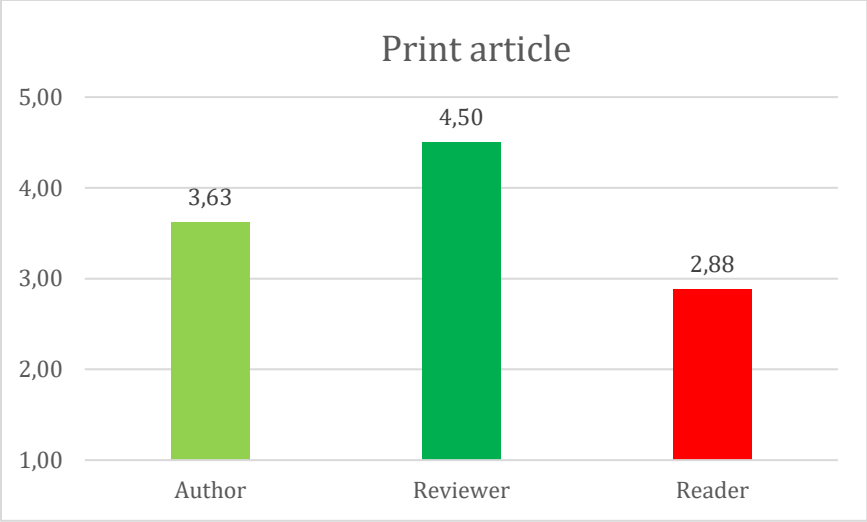


Figure 22. Average score of the feature "Print article".

1.19. Open access

As discussed in the section "Improvements" of last chapter, many remarks from participants are related to the price of articles. Indeed, many of them want more free articles. A future open source scientific publishing platform should be of this type. The platform would only require to sign in with an email address and a password, but without subscription fees.

1.20. Open peer review

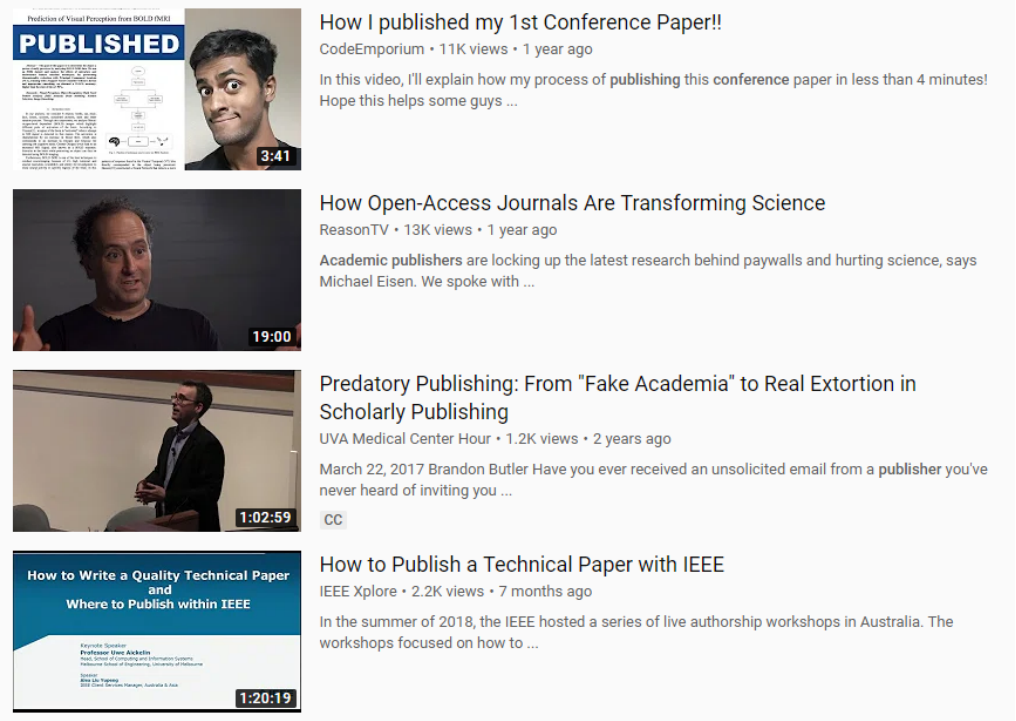
As we saw in the chapter about the peer review process, the open peer review addresses many issues mainly related to authors, reviewers, and the interactions between them, like removing the anonymity of authors and reviewers, publishing review reports, the possibility to interact between participants, crowdsourcing reviews, or making papers available before it has been accepted in order to get comments from the public. Given all advantages and disadvantages of all types of peer review, a future open source scientific publishing platform should use the open peer review for its publication process.

2. New features

In the previous chapter, some improvements have been listed and the features a future open source scientific publishing platform should have will be detailed in this chapter.

2.1. New tab showing conferences and videos

The first new feature is a tab on the search results page, which, once clicked, will display scientific conferences or videos related to the subject the user is looking for. There will then be two tabs, one will be a "classic" tab where the platform will provide to the user different types of articles, which is in fact the way of searching provided by scientific publishing platform at the moment, and the other one will be a "media" tab collecting conferences and videos. Below is an example of the “media” tab.



Source: YouTube

2.2. Tags on articles

The idea of this feature is to be able to put a personalized tag on an article in order to make a classification personalized by the user. This feature is a kind of “add to favorites” but with categories that the user can create in order to find back articles about subject in an easier way.

2.3. Link to a cited article

Scientific publishing platforms provide at the moment the possibility for the user to access references directly in the text (see numbers in the example below). Once clicked, the platform shows the reference of the article from which the sentence comes. The idea of this new feature is to replace the link to the reference by a direct link to the cited article itself. It would open a new window with the article found on the same platform if it is accessible, or on another platform.

> This conflict is apparent in job applications as well. Applications which require a listing of all publications put an emphasis on the number of articles published—"the length of one's vita" [1]. Alternatively, some organizations are moving toward just requesting the few most "important" or "impactful" publications [3, 17]. While this emphasizes quality over quantity, it can create an opportunity for a new problem to arise in the form of a mismatch between the applicant's and selection committee's conceptions of what constitutes a high-quality paper.

VIII. Conclusion

Through this thesis we saw that there are many issues with the process of scientific publishing such as the cost in term of money and time, the unreliability and inconsistency of decisions linked to the acceptance or rejection of papers, the lack of incentives for reviewers, and the social and publication biases.

In a first part, we introduced the two different types of open accessibility: Gold Open Access and Green Open Access. We also analyzed the different types of peer review in order to better understand if one could be applied to a future open source scientific publishing platform, and we saw that the open peer review addresses many issues found in traditional peer reviewing.

In a second part, we made a list of all features that current scientific publishing platforms are providing to authors, reviewers and readers. Together with the survey conducted for this thesis, this list has been improved to determine which features a future open source scientific publishing platform should provide, shortening the amount of features already existing, but extending this list with new features.

"In light of its obvious advantages over the current ecosystem, it is tempting to predict that scholarly communication and other research activities will eventually take place on the blockchain. Its potential impact touches many, if not all, challenges around scholarly communication, especially those to do with trust, reproducibility, transparency, and access" (Van Rossum, 2017). According to Van Rossum, there is room for improvement by using the blockchain in order to solve some issues related to the scientific publishing process. Unfortunately, this solution hasn't been developed within the scope of this thesis, but further research could be done about blockchain and how it could help scientific publishing to perform better.

IX. References

1. Fialaa, C., & Diamandis, E. (2017). The emerging landscape of scientific publishing. Clinical Biochemistry.

2. G. Akterian, S. (2017). TOWARDS OPEN ACCESS SCIENTIFIC PUBLISHING. Biomedical Reviews, 129-137.

3. Lasker, S. (2018). Peer Review system: A Golden standard for publications process. Bangladesh Journal of Bioethics, 13-23.

4. Tomkinsa, A., Zhang, M., & Heavlin, W. D. (2017). Reviewer bias in single-versus double-blind peer review. Proceedings of the National Academy of Sciences.

5. Forgues, B., Liarte, S. (2013). Academic Publishing: Past and Future. M@n@gement 2013/5 (Vol.16).

6. Larivière, V., Haustein, S., Mongeon, P. (2015, June 10). The Oligopoly of Academic Publishers in the Digital Era. PLOS ONE 10(6).

7. Watson, R. (2015, September). Exploring the peer review process. Nursing Open And Journal Of Advanced Nursing.

8. Armstrong JS: Barriers to Scientific Contributions: The Authors Formula. Behav Brain Sci. Cambridge University Press (CUP).1982;5(02):197– 199.

9. Suber P: Open Access. Cambridge, MA: MIT Press, 2012.

10. Ford E: Defining and Characterizing Open Peer Review: A Review of the Literature. J Scholarly Publ. University of Toronto Press Inc. (UTPress), 2013; 44(4): 311–26.

11. Ross-Hellauer T. (2017). What is open peer review? A systematic review. F1000Research, 6, 588.

12. Website: ENAGO (2018), https://www.enago.com/academy/experimenting-with-collaborative-peer-review, consulted 16/04/19

13. Wesbite: Elsevier (2014), https://www.elsevier.com/reviewers-update/story/innovation-in-publishing/experimenting-with-collaborative-peer-review, consulted 16/04/19

14. Website: Frontiers, https://www.frontiersin.org/about/review-system, consulted 16/04/19

15. Pöschl, U. (2012). Multi-Stage Open Peer Review: Scientific Evaluation Integrating the Strengths of Traditional Peer Review with the Virtues of Transparency and Self-Regulation, https://www.frontiersin.org/article/10.3389/fncom.2012.00033

16. Barroga, E. (2013, November). Cascading peer review for open-access publishing. European Science Editing 2013; 39(4):90-91.

17. Ali, P. A., & Watson, R. (2016). Peer review and the publication process. Nursing open, 3(4), 193–202.

18. Hunter, J. (2012). Post-Publication Peer Review: Opening Up Scientific Conversation. Frontiers in Computational Neuroscience, Vol. 6.

19. Kovanis, M., Trinquart, L., Ravaud, P., & Porcher, R. (2017). Evaluating alternative systems of peer review: a large-scale agent-based modeling approach to scientific publication. Scientometrics, 113(1), 651–671.

20. Website: https://www.editage.com/insights/7-common-types-of-academic-peer-review, consulted 16/04/19.

21. Tracz, V., & Lawrence, R. (2016). Towards an open science publishing platform. F1000Research, 5, 130.Appendices

22. Laakso M, Welling P, Bukvova H, Nyman L, Björk B-C, Hedlund T (2011) The Development of Open Access Journal Publishing from 1993 to 2009. PLoS ONE 6(6): e20961.

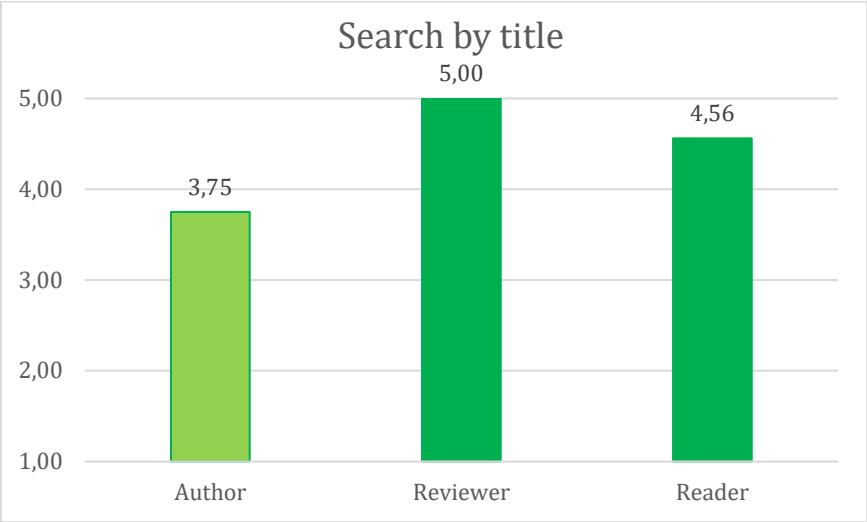
23. Björk B-C, Welling P, Laakso M, Majlender P, Hedlund T, Guðnason G (2010) Open Access to the Scientific Journal Literature: Situation 2009. PLoS ONE 5(6): e11273.

24. Van Rossum, J. (2017). Blockchain for Research: Perspectives on a New Paradigm for Scholarly Communication. Digital Science Report.

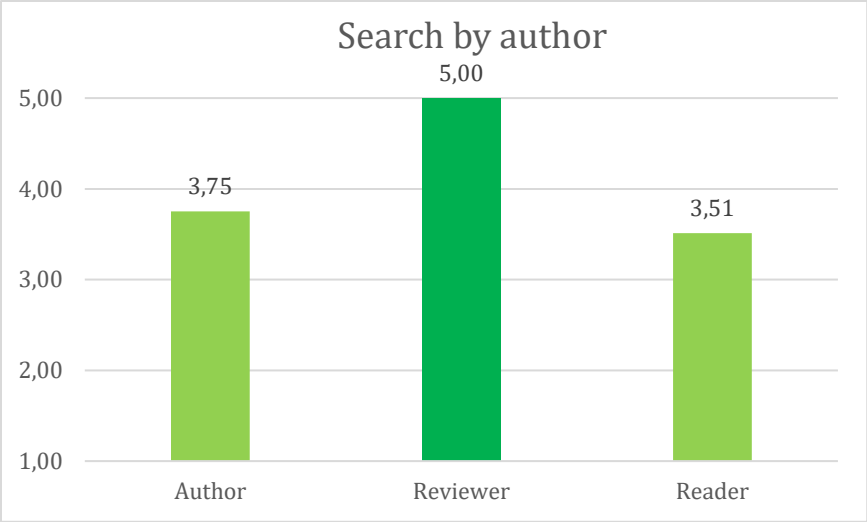
25. Peters, D. P., & Ceci, S. J. (1982). Peer-review practices of psychological journals: The fate of published articles, submitted again. Behavioral and Brain Sciences, 5(2), 187-255.

X. Appendices

Appendix 1:



Average score of the feature “Search by title”.



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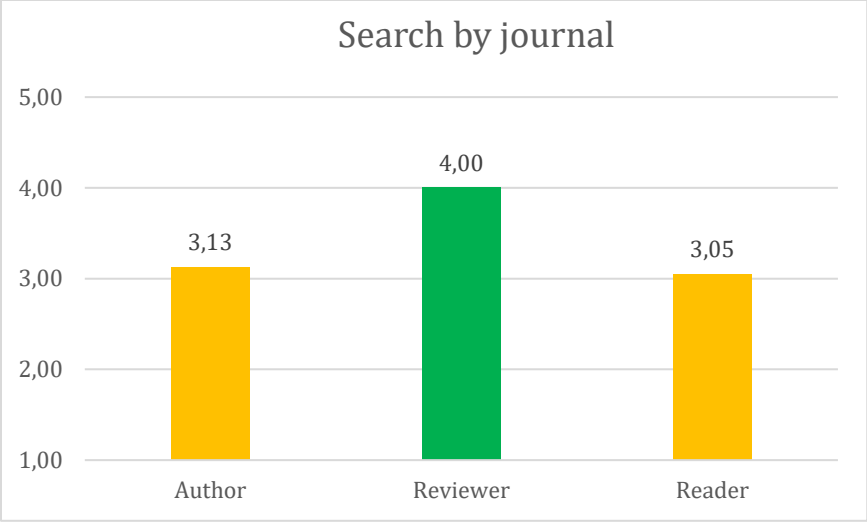

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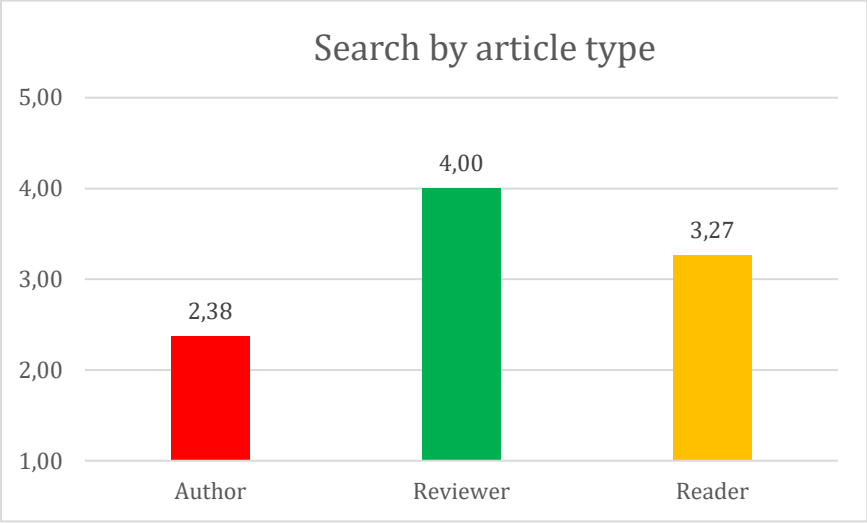
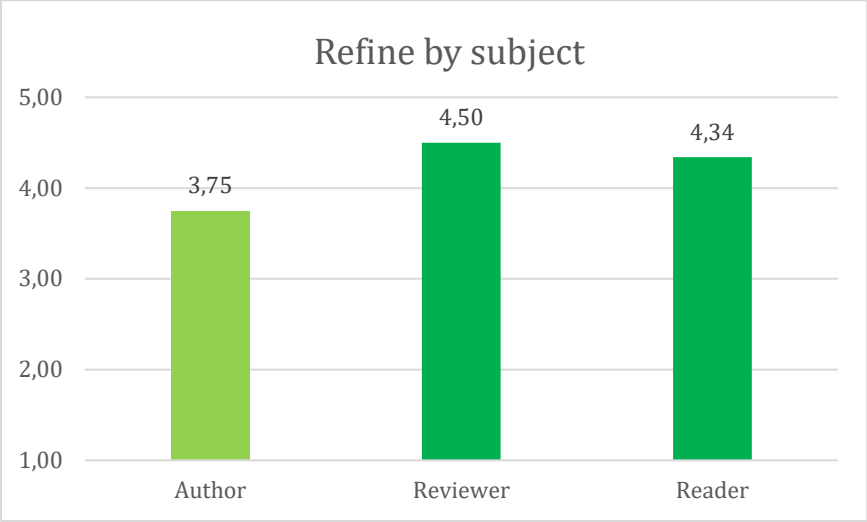


Average score of the feature “Search by article type”.

Appendix 2:



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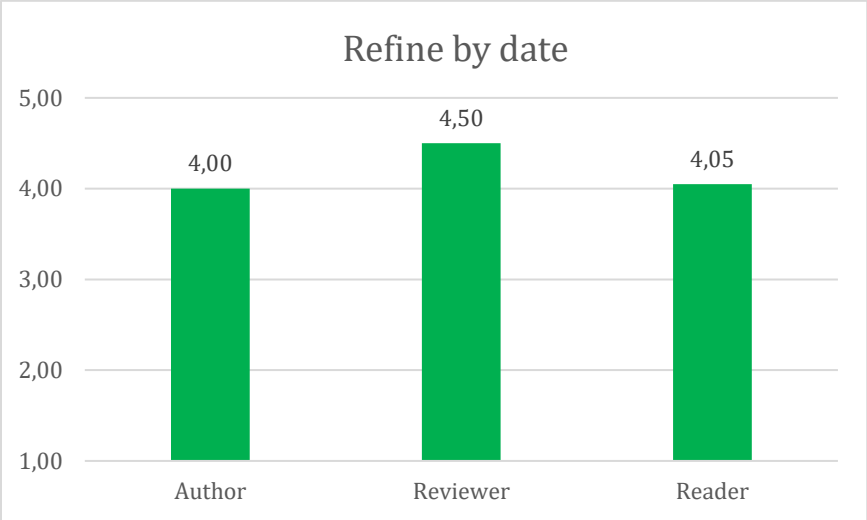

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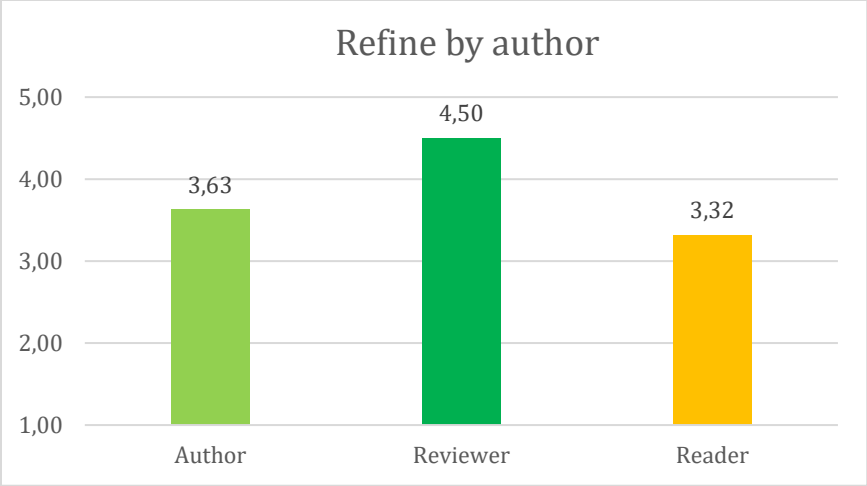
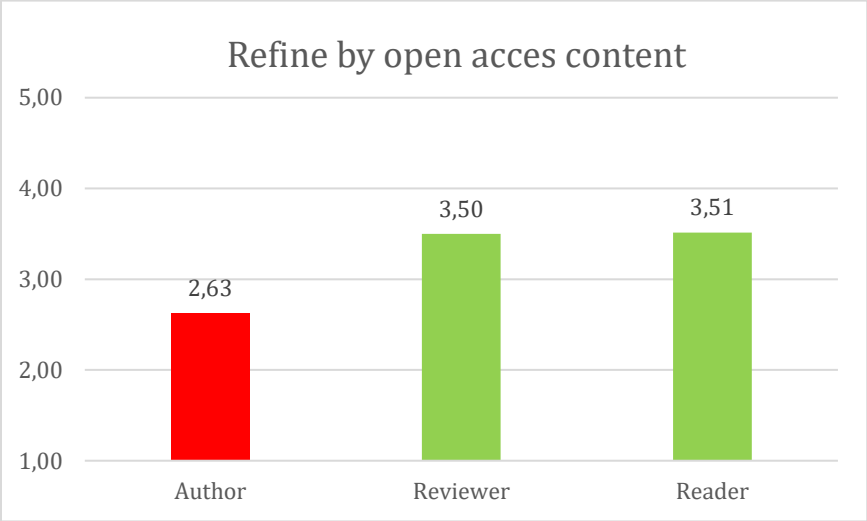
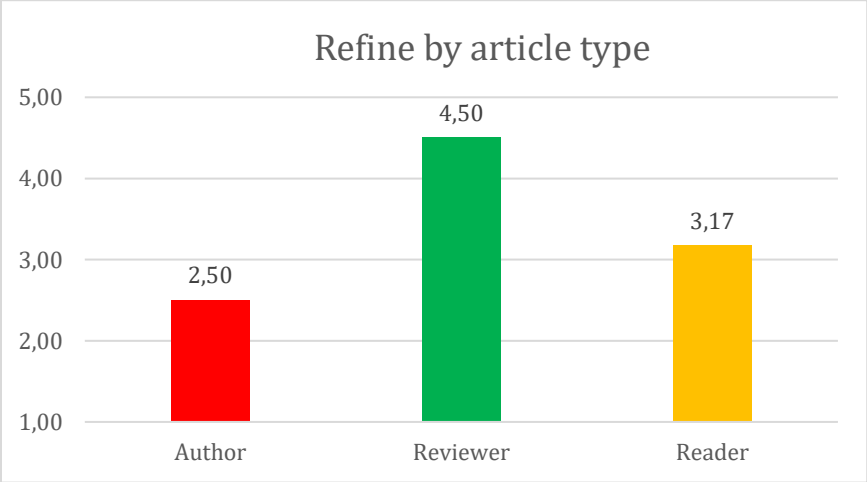


Average score of the feature “Refine by author”.

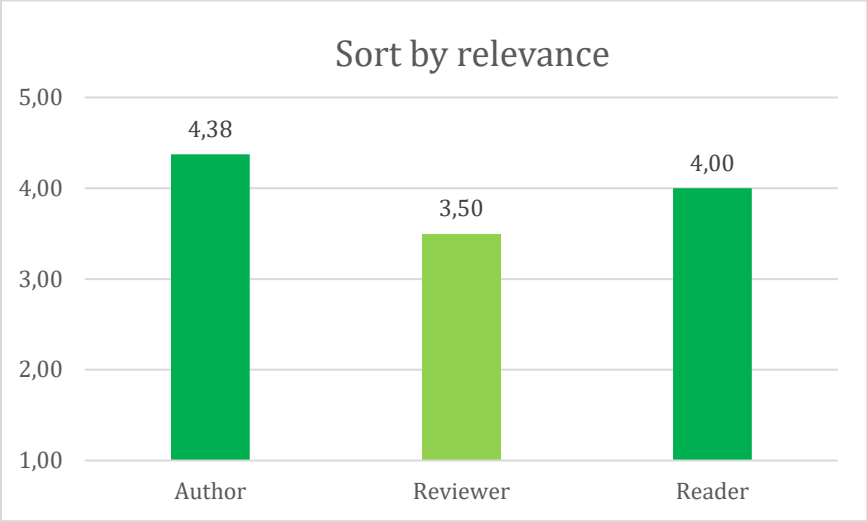


Average score of the feature “Refine by open access content”.



Average score of the feature “Refine by article type”.

Appendix 3:



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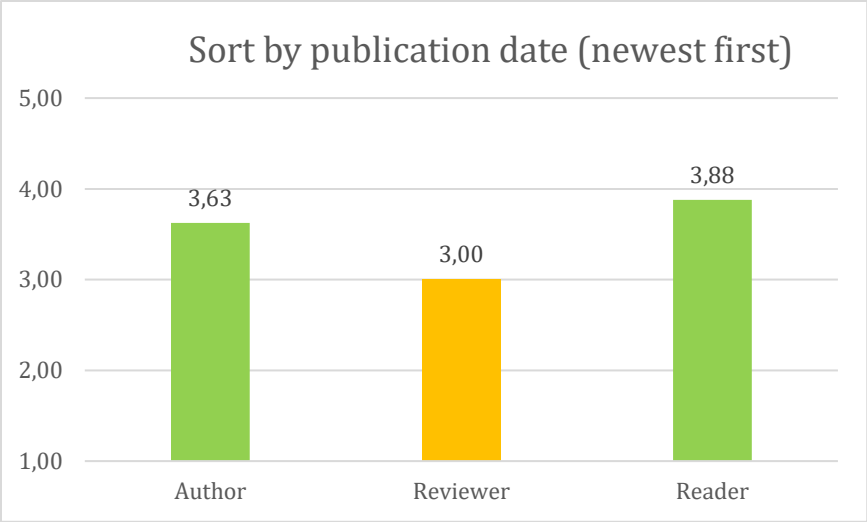
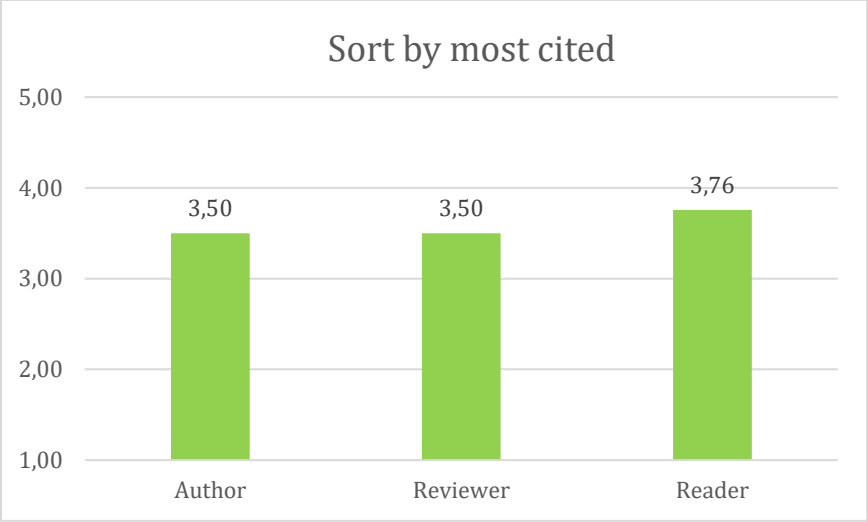
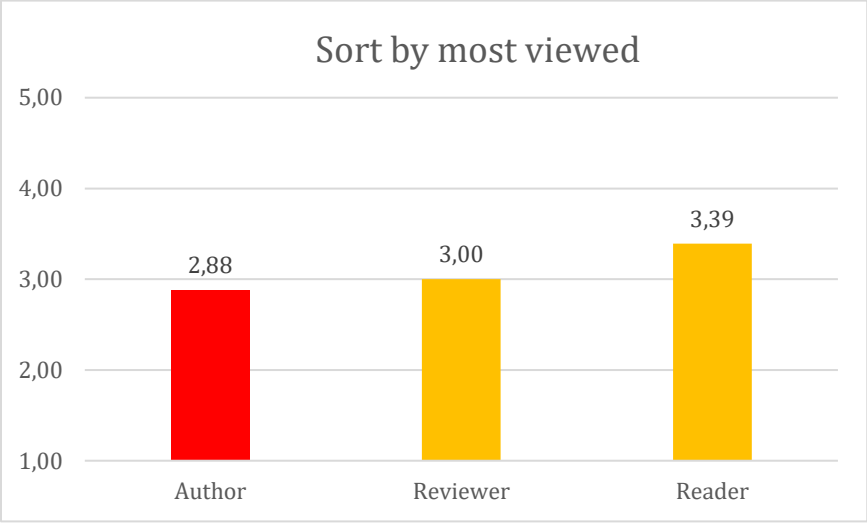


Average score of the feature “Sort by publication date (newest first)”.



Average score of the feature “Sort by most cited”.



Average score of the feature “Sort by most viewed”.