Library Waves: A Biannual Peer Reviewed Journal of Library and Information Science
Volume 8, Issue 2 (July-December, 2022); ISSN: 2455-2291 (Online); Website: www.librarywaves.com

An Overview of Open Access Scholarly Article Discovery Tools

*** Priyanka Khuntia** **** Shamim Aktar Munshi**[#]

***** Librarian, Panchakot Mahavidyalaya, Purulia (West Bengal) 723121, INDIA;
Email: priyankakhuntia004@gmail.com; ORCID: https://orcid.org/0000-0002-8056-5196
****** Librarian, Ananda Chandra College, Jalpaiguri (West Bengal) 735101, INDIA;
Email: munshishamim14@gmail.com; ORCID: https://orcid.org/0000-0002-9362-9435
Corresponding author.

Received: 09 November 2022 ***Accepted: 22 December 2022***

Abstract

The purpose of this study is to identify the most popular open-access discovery tools, their important features, and their significance for the research community and librarians. The study found that Unpaywall and EndNote Click (Kopernio) are the best extensions for finding Open Access (AO) scholarly articles. Unpaywall and EndNote Click have broad coverage areas, easily show OA articles where they are legally deposited, an easy download procedure, user-friendly settings, etc. Both extensions have a campus library integration module. EndNote Click has a locker system for saving the PDF for future use. On EndNote, users can get full text articles that are not freely available through the "Request" tool from a publisher or author. Both extensions are linked to social media platforms such as Twitter, email, Facebook, Linekdin, and others. However, many libraries integrate their institutional repository with these plug-ins to easily manage the resource and get better benefits from these browser extension tools to increase the value and usage of the library collections. Users can access their library subscriptions on and off campus through these tools' settings.

Keywords: Plug-in software, Browser extension. Open access research tools, OA Article discovery tool, Google Scholar Button, Unpaywall, Open Access Button, EndNote Click, Kopernio, Lazy scholar.

1. Introduction

The Open Access movement encourages researchers to publish their scholarly output in an open-access (OA) journal or submit it to their institutional repositories. Similarly, academic social networking sites, i.e., ResearchGate, LinkedIn and Academia, offer open access platforms where researchers can upload their research work, discuss it among their peers, and share it with others for more visibility. However, knowing which articles are available openly and searching for open access articles through the millions of web pages like finding hay in the needle stack for the research community. Finding OA articles took not only time but was also frustrating for researchers. To ease the process, some plug-in software, such as Kopernio, Unpaywall, the Open Access Button, Lazy Scholar, and Google Scholar Button, appear to break the paywall barriers for the scholar community (Ayre, 2019). The plugin also helps the librarian to take advantage of its benefits, to provide better ILL service to their users with no time or cost involved. These tools work through a browser extension, some of which are specific to a particular browser while others work in all the popular browsers. These tools harvest scholarly articles against your search from a different platform where articles are legally deposited as open access by author and publisher. Notably, the purpose of this study is to identify open access discovery tools, their important features, and the significance of these

for the research community and librarians as well. Data collection was based on software extensions that are retrieved from chrome extensions and web-based documents. This study used Google Chrome and Firefox extensions because these two browsers are more popular.

2. Objectives of the study

- To learn more about browser extension software for open access article discovery.
- To find out how to work these software.
- To help the research community to easy access the open access articles.
- To determine which of the five plug-in software works well.

3. Plug-in discovery tools

The amount of information on the internet is overwhelming, with endless websites and sources. There is no good way to save, annotate, and track the important things you find. Bookmarks, browser tabs, and long-copy or paste content documents are a headache. Most documents are easily available on the internet, but there is a gap between availability and discoverability. In this situation, OA article discovery tools act as a good friend to researchers and library staff.

There is much information available on the internet, but some programmers have been developing and constructing software designed especially for scholarly articles that manages the scholarly information (Ayre, 2019). These tools provide a free service to locate OA articles and present paywalled papers that have been legally archived and are freely available on other websites to users who might otherwise have hit a paywalled version. Also, for libraries, Inter-library loan or document delivery service are the main parts of reference service. Article discovery tools are a great option to give better service to users with less time, effort, and cost.

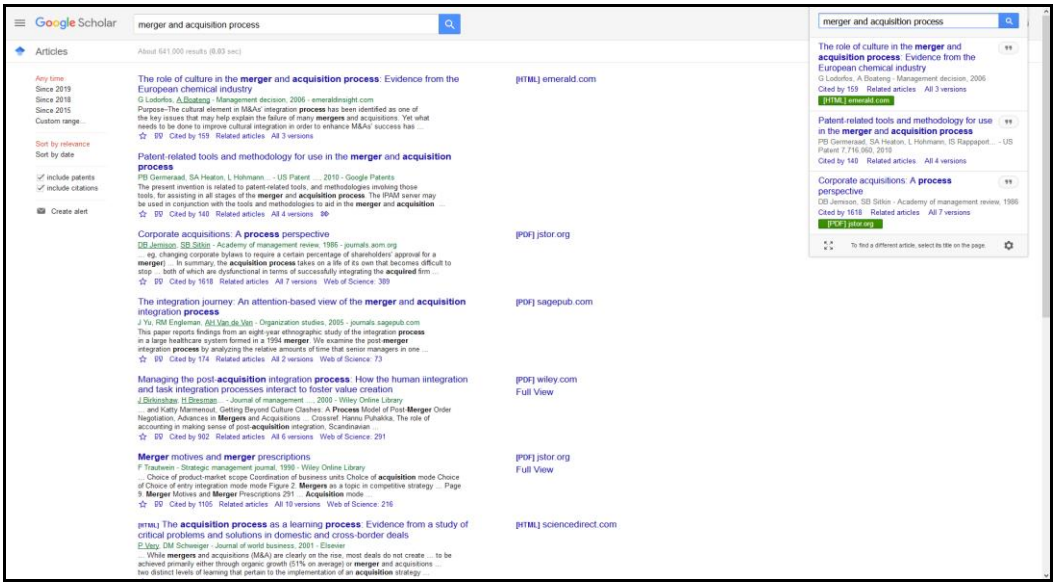
There are many plug-in software available; however, this study discussed only five that are more popular, i.e., Google Scholar Button, EndNote Click (formerly Kopernio), Lazy Scholar, Unpaywall, and Open Access Button (see Table 1).

Table 1: **Most Plug-in Scholarly Article Discovery tools**

Product	**Open Access Button**	**Lazy Scholar**	**Google Scholar Button**	**Unpaywall**	**EndNote Click** (Formerly Kopernio)
Developer	Joe McArthur	Colby Vorland	Google	Impactstory	Kopernio-acquired by Clarivate
Business Model	Free	**Free**	Free	Free	Free but also have premium version
Available from	2013	2014	2015	2017	2017
Available At	https://openaccesbutton.org/	http://www.lazyscholar.org/	http://www.lazyscholar.org/	https://unpaywall.org/	https://click.endnote.com/

Google Scholar Button

This plugin software was built in 2015 for easy and speedy access to the literature in the Google Scholar database from any web page and allows closed articles to which a user has access via their own institution's subscriptions by configuring Google Scholar with the library's URL. More than 300,000 users currently use the plugin.



Screenshot 1: PDF access via Google scholar button

How it works

It works on Chrome, Firefox, and Safari web browsers with an easy extension procedure. To find the full text on the web or in any library, first select the title of the paper on the web page, then click on the Scholar button. It will show if the PDF form of the article is available in the database. With Google Scholar button, users can find their desired article in one click. The main features of the Google Scholar button are that users can just highlight the article title on any web page and then click on the Google Scholar button on their browser's toolbar to search Google Scholar; Google Scholar will pick up the article title automatically on any well-formatted journal article pages; and users can format references and export citations using the Google Scholar button.

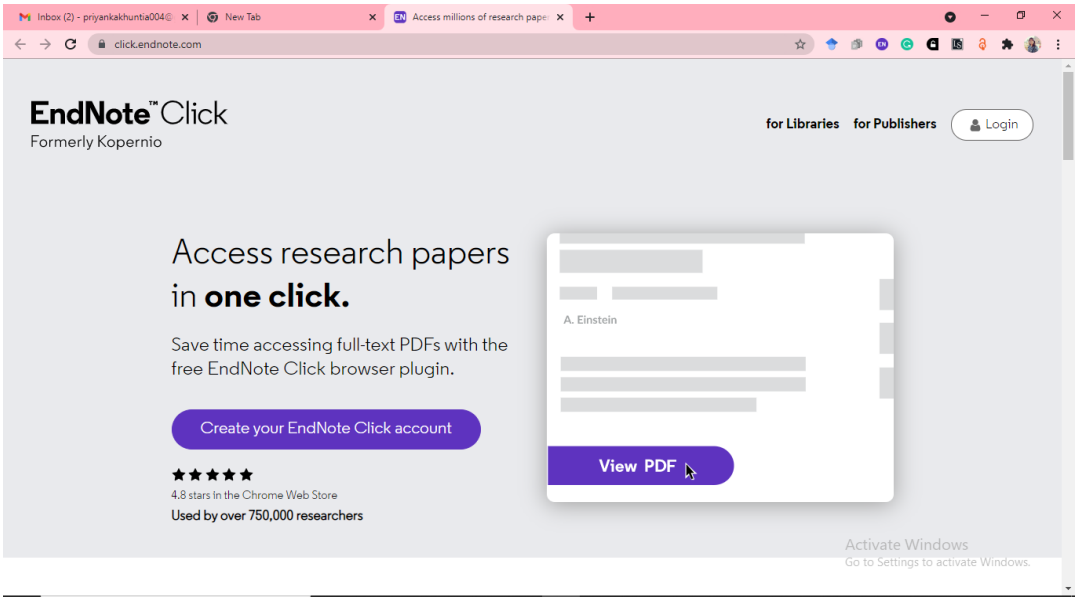
The Google Scholar button has an option to add the library link to your Google Scholar settings. Users can obtain any full-text article from a library subscription directly by clicking the Google Scholar button. Also, users can get article citations in APA, MLA, or Chicago style, and you can export the citation to your citation management tool, such as RefWorks, by clicking the quotation mark. Also, the user can access library subscriptions by login with id and password or set up the browser to use the library proxy.

EndNote Click formerly Kopernio

EndNote Click (Kopernio) is a very popular research tool for researchers and scholars to find out their desired article from millions of web sources, even if it finds the article in a paywall database where it is authentically deposited. It enables one-click access to academic journal articles across library subscriptions, publisher websites, OA repositories, databases, and

search engines. Also, Kopernio integrates with Mendeley, EndNote, Dropbox, and Zotero so users can easily export their desired references.

Jan Reichett and Ben Kaube built this software in 2016. and it is powered by the Web of Science with Clarivate Analytics. EndNote Click (Kopernio) includes cloud storage for your papers, article sharing features, and integrations with over 20,000 online platforms. It gives one-click access directly to the PDF (no abstract pages, logins, redirects, or other hurdles). The data of the EndNote click (Kopernio) is from Google Scholar, PubMed, Web of Science, and more than 20,000 other sites. It is linked with Twitter, Facebook, and LinkedIn social media. Currently, EndNote Click (Kopernio) is used by around 750,000 users. (click.endnote.com)



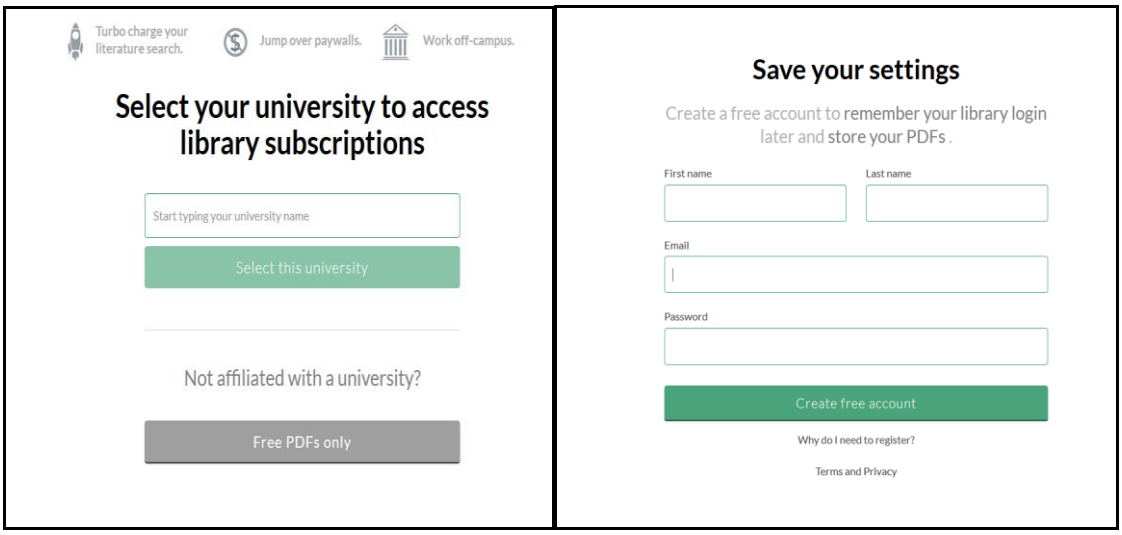
Screenshot 2: EndNote Click interface

How it Works

It gives an easy extension for Google Chrome, Firefox, and the Opera Mini browser. Another option for access is direct sign-up by any email address, but the institution name is required for library integration. There is a list of universities and institutions.

EndNote Click (Kopernio) integrates with library proxies and library authentication systems to retrieve research articles via library subscriptions. If your library is supported, EndNote Click (Kopernio) will configure this for you automatically. Below is a list of resources that EndNote Click (Kopernio) tries to access and from which PDFs can be retrieved:

- Open access publishers
- Paywalled publishers
- Abstract databases including Pubmed, Scopus, and Web of Science.
- Pre-print servers such as the arXiv
- Selected institutional and subject repositories



Screenshot 3: EndNote Click Settings page

Screenshot 4: PDF access by EndNote Click

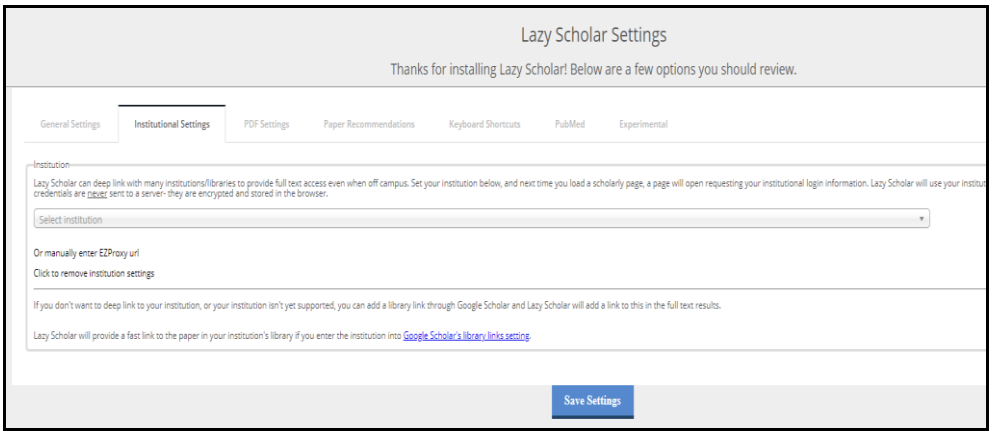
EndNote Click (Kopernio) is set up to prioritize, search for, and return articles from the library subscriptions. If searching that content does not result in any hits, or if you do not have a library subscription, EndNote Click (Kopernio) will by default search the following hierarchy of sources: the user's history, open access publishers, and third-party content (e.g., Google Scholar). You may, however, configure this hierarchy if you wish to do so.

Where possible, EndNote Click (Kopernio) will retrieve the final published version of the journal article. For non-open-access articles that are not available via your institutional subscription, Kopernio will try to find pre-prints and author manuscripts deposited in institutional repositories. Also, Kopernio can provide one-click access to articles both on and off campus. Kopernio can connect to the library by proxy server, recognise users' entitlements, and retrieve PDFs for users when they are off campus (i.e., outside of your institution's IP range). It also works with Endnote.

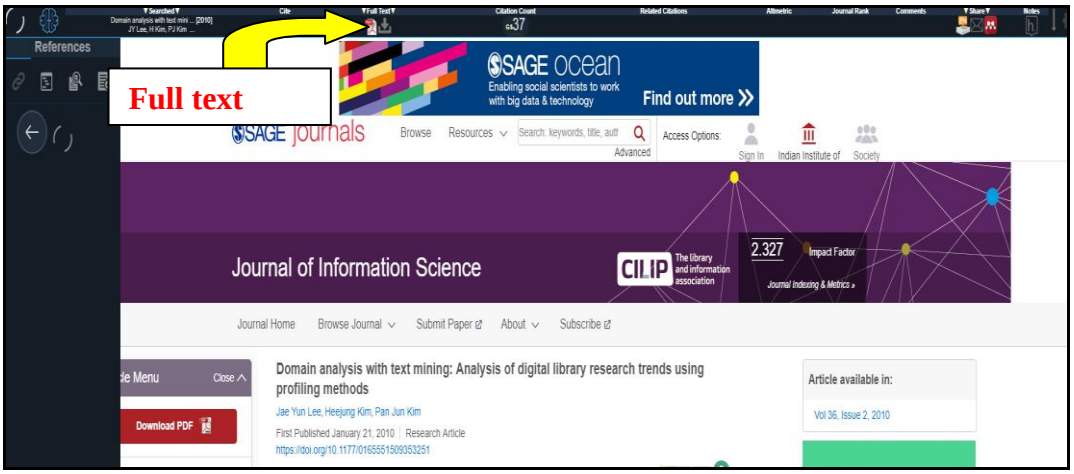
When users access any article through Kopernio, it is stored in the cloud in the user's personal "Kopernio Locker" for future access to the same article without investing any effort or time.

Lazy Scholar

Lazy Scholar browser extension software is a personal project by Colby Vorland, a post-doctoral fellow at Indiana University in 2013. Lazy Scholar harvests the data from Google Scholar, PubMed Central, EuropePMC, DOAI.io, and Dissem.in. It gives users scholarly articles with related articles, journal metrics, citations, browsing history, etc. Now lazy Scholar 2.6.0 version available. It's regularly updated. Also, it's connected to Twitter, an RSS feed, and email. The lazy scholar has around 10,959 users.



Screenshot 5: Lazy Scholar Account Extension Settings on Chrome



Screenshot 6: OA article find by Lazy Scholar

How its work

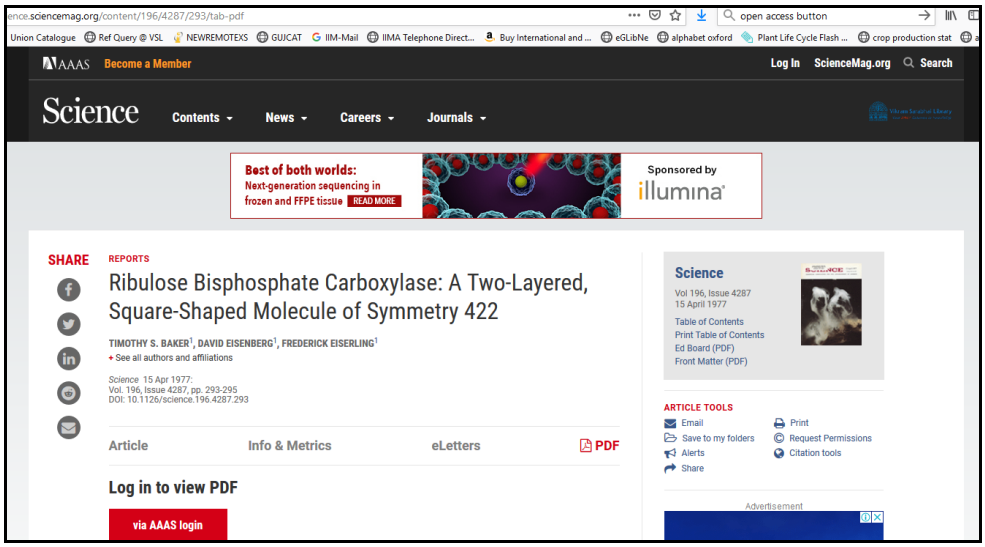
Lazy Scholar provides browser extensions for Chrome and Firefox. After installation, Lazy Scholar has various settings, such as general settings, institutional settings, PDF settings, paper recommendation settings, keyboard shortcuts, and PubMed. There are several options under each setting.

When searching on a search engine, Lazy Scholar automatically appears and shows a PDF if full text is available and provides various metrics and comments, along with fast citations. "Lazy Scholar can deep link with the institution to find full texts even when you are off campus. In addition, it attempts to extract helpful information about the paper if relevant, such as quick links to the population, interventions, outcomes, measurements, a funding

statement, an outline, references, abbreviations, and supplemental documents. Further, it checks for comments on the paper in PubPeer, provides various citation metrics on the paper and journal, and "one-click citation styles, including a preformed PowerPoint style" (http://www.lazyscholar.org/).

Open Access Button

Joe McArthur, Mark MacGillivray, Natalia Norori, and SPARC (the Scholarly Publishing and Academic Resources Coalition) founded the Open Access Button in November 2013. It uses the data from Unpaywall, Share, Core, OpenAIRE. Dissem.in, Europe PMC, and Base. Also, it is linked with blogs, Twitter, Facebook, GitHub, and email. The Open Access button has more than 30000 (as of April 21, 2022).



Screenshot 7: PDF harvest by Open access button

How it works

Open Access Button is an easy browser extension available only on Google Chrome. It gives you thousands of sources with millions of articles to instantly link you to free, legal, full-text articles. If the article is not open access, then the Open Access button requests the article from the author.

For the library, Open Access Button has built a suite of tools that provide the link necessary to translate gains towards Open Access into benefits for both budgets and patrons. Such as "deliver OA, Embed OA, OA sheet, harnessing open access on campus, and Integration.

The Open Access button has a "Request" tool to access non-OA articles. Here, users can create a request for the article, and the Open Access button gives a request to the author to make their research free. After that, the requester is notified and can track progress.

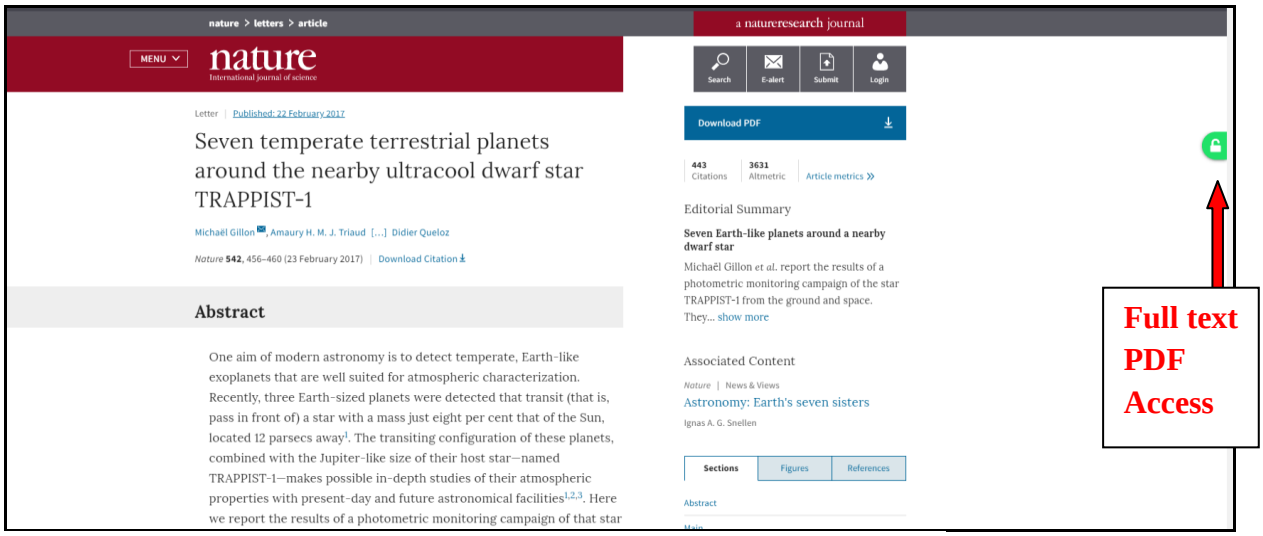
Unpaywall

Unpaywall makes finding OA articles for individual users through a plug-in on browsers. Heather Piwowar and Jason Priem introduced an extension software to find open access full-text literature for researchers, library staff, and scholars in 2016.

The unpaywall site declares that they harvest all the documents from thousands of universities and governments worldwide and full text articles uploaded by authors, with permission from publishers.

It is owned by Impact Factory. Impact Factory is a tool for open access. It helps to make scholarly research more open, accessible, and reusable. It works behind the unpay wall.

Unpaywall uses the data from Europe PMC, Web of Science, The British Library, and thousands of libraries worldwide. It has more than 31793748 open access links to scholarly articles, and more than 500000 individual users have used this free browser extension of Unpaywall. (unpaywall.org).

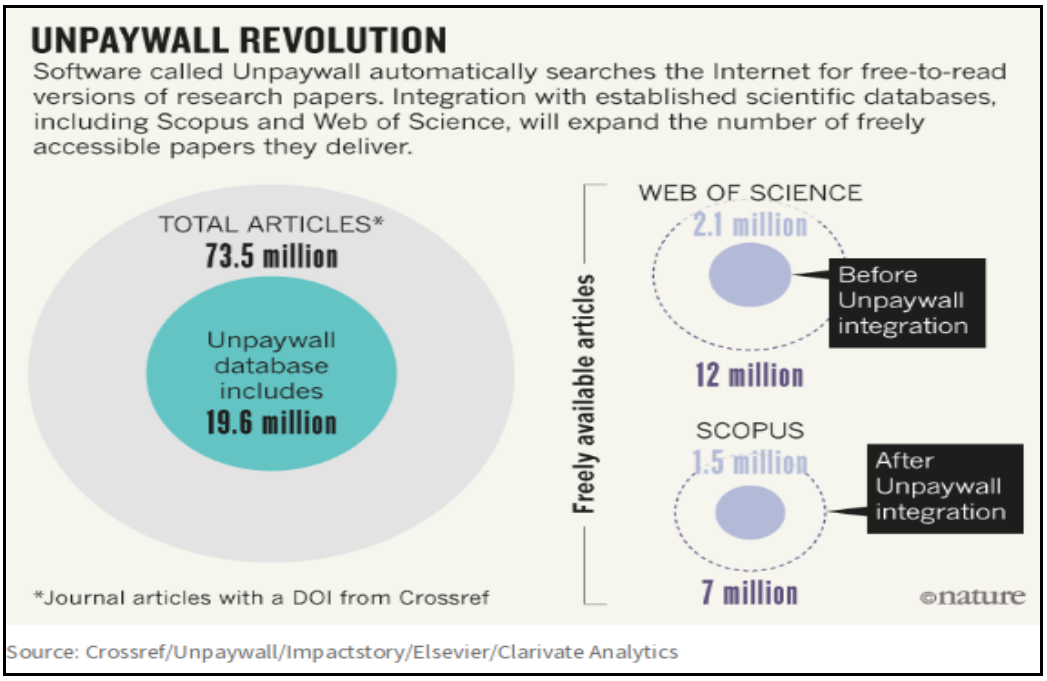


Screenshot 8: Open access article access by Unpaywall

How it Works

It provides easy installation or extension on Google Chrome and Firefox. Unpaywall matches the DOI or URI with their database, and when the plugin is activated, Unpaywall will indicate the users when and where an article can be found for free. The Unpaywall does not harvest any personal databases such as ResearchGate, academia.edu, SciHub, etc. Several features of Unpaywall include the fact that you can turn it off without uninstalling it. Unpaywall mainly collects articles from the Green Open Access database. Libraries can integrate Unpaywall into their SFX, 360 Link, or Primo Link resolvers so that library users can read OA copies in cases without subscription access. Over 1000 libraries worldwide are using this now. Another option of Unpaywall is OA Nerd Mode, which shows the OA color, that indicates whether the full-text article is Green, Gold, or Bronze.

Integration: Many search engines are starting to integrate with Unpaywall to take advantage of Unpaywall. Elsevier announced the integration of Unpaywall into Scopus database searches. In 2017, Unpaywall integrated into the web of science operated with Clarivate Analytics.



Screenshot 9: Unpaywall Integration

4. Comparative Overview

Following table shows the overall view of these browser extension software.

Table 2: Comparative analysis

Product	**Open Access Button**	**Lazy Scholar**	**Google Scholar Button**	**UnpayWall**	**EndNote Click** (Formerly Kopernio)
Foundation year	2013	2013	2015	2016	2016
Founder	Joe McArthur, Mark MacGillivray, Natalia Norori	Colby Vorland	Google	Heather Piwowar and Jason Priem	Jan Reichett& Ben Kaube
Browser support	Google chrome	Google Chrome and Firefox	Google Chrome, Firefox, and Safari	Google Chrome and Firefox	Google Chrome, Firefox and Opera Mini
User	14293	10959	2168616	204896	150000
Full text	Yes	Yes	Yes	Yes	Yes

Citation	No	Yes	Yes	No	No
Library integration	On campus and off campus	On campus and off campus	On campus, off campus	On campus	On campus, Off campus.
Save search history/ PDF	No	Yes	No	No	Yes, it has locker for future access
Data source	Unpaywall, Share, Core, OpenAIRE. Dissem.in, Europe PMC, Base	Google Scholar, Pubmed central, EuropePMC, DOAI.io, Dissem.in.	Google scholar database	Europe PMC, Web of Science, The British library and Thousands of libraries worldwide.	Google Scholar, PubMed, Web of Science, and 20000 other sites
Social media	Blog, Twitter, Facebook, GitHub, Email	Twitter, Rss feed, Email	NA	Twitter, GitHub, Email	Twitter, Facebook, LinkedIn

5. Conclusion

We have represented the data on five plug-in softwares and also highlighted some of their points. As per the deep analysis, the study recommended Unpaywall and EndNote Click as the best scholarly discovery tool. Unpaywall has broad coverage because of publisher integration, Unpaywall automatically detects when a free version is available. Also, Researcher can access the data by using the API REST, download weekly data feed or simple query tool. Users will be very comfortable with Kopernio because it has more options to jump the paywall barrier. This software gives a "Request" tool for the article, which is not OA. Users can request the author to grant access to the desired article.

Kopernio has a locker system, where users search for articles that are automatically saved for the future. But, Kopernio harvests the ResearchGate, academia.edu database which include content that breaches copyright. Lazy Scholar is a personal project by a post-doctoral student paper that gives users access to articles citations, related paper, and journal metrics with full-text article. But browser extensions is very complex compared to other software. Lazy scholars harvest ResearchGate documents. Sometimes it needs to wake up to search for articles. The Google Scholar button only uses the Google Scholar database; naturally, it is only usable for Google database searches for full text and it includes content uploaded by others that breaches copyright because it harvest from illegal websites such as ResearchGate, AcademiaEdu etc. Google scholar button needs activating each time whenever researcher searches a document. The Open Access button works as a metasearch engine for open-access articles. It works very easily and clearly indicating full-text articles if they are open access. We have found around 80 % output from the search result. Nowadays, many articles are hidden behind paywall barriers. These plug-in software/ browser extension softwares show the easiest way to find where legally desired articles can be found.

References

1. *About Google Scholar*. (n.d.). Retrieved August 29, 2022, from https://scholar.google.com/intl/en/scholar/about.html
2. Ayre, L. (2019). Top tools for researchers: browser extensions. Retrieved August 29, 2022, from https://gradschoolreadingroom.blogspot.com/2019/10/top-tools-for-researchers-browser.html
3. Button, O.A. (n.d.-a). *Open Access Button*. Retrieved August 29, 2022, from https://openaccessbutton.org/
4. Chawla, D.S. (n.d.). A collection of web-browser plug-ins is making the scholarly literature more discoverable. 3.
5. Clarivate. (2022). *Access millions of research papers in one click.* Retrieved August 29, 2022, from https://click.endnote.com/
6. Else, H., & Glanz, B. (n.d.). *The rise and rise of Unpaywall*. 2. Retrieved August 29, 2022, from https://www.proquest.com/docview/2103566529
7. *Lazy Scholar | Extension*. (n.d.). Retrieved August 29, 2022, from http://www.lazyscholar.org/
8. *The Open Access Button – Library and IT news*. (n.d.). Retrieved August 29, 2022, from https://blogs.kent.ac.uk/isnews/the-open-access-button/
9. *Unpaywall: An open database of 20 million free scholarly articles*. (n.d.). Retrieved August 29, 2022, from https://unpaywall.org/

■■■