

Lecture 5: Overview of Tools for Maximizing Academic Visibility and Impact of Research Output

Science Communication: Research Productivity and Data Analytics using Open Source Software

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Hello Learners, My name is Nabi Hasan and I am the Librarian and Head at Central Library, IIT Delhi. Maximising academic visibility and impact of research output is crucial for faculty members and researchers, or authors who want to disseminate their work effectively and reach a wider audience. So, as part of this NPTEL lecture, I shall be giving you an overview of the different tools for maximising academic visibility and the impact of research. You might be doing great academic work in your institution, but if you are not able to market or make it visible or leave an impact that your work actually deserves, then you perhaps are doing injustice with your hard work. So, as part of this presentation, I am going to cover some of these areas that is background information on this topic, mapping, bibliographic, scientific, assessing tools, citation analysis, H-index, G-index, I10-index, E-index, Impact Factor and other related parameters, tools, sites, resources to increase academic and research visibility, and public perception. I will be quoting examples and case studies as well. Then we will be talking about marketing your research and other work, and how to better market your work. We will be also talking about data visualisation tools and how to increase your citation and of course, we will be summing up at the end of the presentation.

So, this is the screen which is showing you different social media, altmetrics and other tools connecting each other as well. In today's time, academics and researchers are surrounded with disruptive technologies. It means we have to make use of these technologies fruitfully and judiciously, otherwise these may result in severe wastage of researchers' time and will work as disruptive technology. This concept of disruptive technologies is not new and it was given by Clayton Christensen who first proposed the theory of disruptive technologies in the year 2000. This disruption is basically distracting all of us from our academic research and productive work. Christensen developed a theory for why mainstream, well established, well managed and successful firms fail

when newcomers selling inferior but more modern and scalable technology enter the market.

These are some of the mapping, bibliometrics, or scientometrics or you can say assessing tools. Knowledge of these tools may help you become an important academic or researcher or an important person for your institute. Many of these tools are paid ones like Scopus, or Web of Science, or Dimensions. However there are free tools available as well, like Google Scholar, IRINS, ResearchGate, etc. It means that even if you do not have access to paid tools you can still explore free tools and become an expert in this domain and an important person in the educational ecosystem.

This slide depicts different types of impacts that I am going to give you an overview. However these will be covered in detail in the next few lectures by my other colleagues like author level impact, journal level impact, or institutional level impact as well. The three impacts are defined as the indicators based on recorded events of acts related to scholarly documents or scholarly agents. One of the major names in the field of mapping or science communication, or bibliometrics is Eugene Garfield. One of the contributions of Dr. Garfield known for information science is the concept of the Impact Factor of an article or journal. This Impact Factor first appeared in his 1955 article in science, but probably the most important contribution of Dr. Eugene Garfield to the world of science, and to scholarly research in general is that of the science citation index. He is also known as the grandfather of Google.

So, let us try to understand the importance of citation and why people cite. So, people cite for various reasons like giving credit where credit is due, give support to ideas or citations, refer to interested readers to other sources on the same subject, displays the integrity of the research and the author's erudition, aligns the article with the particular school of thought, shows respect for fellow academics and researchers, want to quote something important or relevant identifying a methodology for corrections or updation, or may be for criticising or disclaiming someone's work or opinions. So, citations are indicators of an article's impact and usefulness to the research community. They are the mode by which peers acknowledge each other's research.

This slide talks about how citation analysis or mapping or bibliometrics or scientometrics help. So, these concepts help us in conceptual mapping or evaluation of research impact. We can know the top researchers, journals, institutions, collaborators, and funders as well. We can determine the importance of a particular work or author. We can analyse the changing pattern of R&D. We can predict future trends in the R&D. We can analyse the genesis and structure of discipline. We can measure and evaluate a region, group or country who is working well in a particular domain.

We can determine superiority for reward, award or recruitment as well. So, this slide talks about H-index. H-index is a very popular term nowadays. As you can see on the screen that the person here is J.E. Hirsch, who first gave the concept of the H-index in 2005. It is an index to quantify an individual's scientific research output and its impact. This is readily available through various sources like Scopus, Web of Science, Google Scholar or ResearchGate.

This figure depicts how the H-index is calculated. Here you can see that there are two scholars, scholar A and scholar B and the H-index of scholar A is 6 and B's H-index is 4. Finding H-index using a readily available tool or database is not difficult. You can see here the example of Professor Bhim Singh of IIT Delhi whose H-index has been given here using Google Scholar. While we are evaluating the H-index of an individual in general, the H-index by Google Scholar could be the highest followed by Scopus and Web of Science. H-index by ResearchGate depends upon the publication that you have uploaded in your profile. So, here the H-index of Professor Bhim Singh who is the most prolific author from IIT Delhi is 101 as on January 11, 2024.

Here you can see a screenshot from the Scopus which shows that his H-index using Scopus is 83. The Web of Science covers fewer journals so here the H-index of Professor Bhim Singh is 64 with 865 publications. As far as ResearchGate is concerned here the H-index depends upon documents that have been uploaded and citations received to those documents. For example, for the same Professor Bhim Singh of IIT Delhi whose H-index using Google Scholar is 101, it is 87 using ResearchGate.

Now let us understand the i10-index as well. So, the i10-index was introduced by Google Scholar in 2011. It is defined as the number of publications with at least 10 citations. It is only accessible from Google Scholar citation and from the author profile section. Michel Foucault is one of the authors with the highest i10-index. As you can see, his i10-index is 1516 as on date. Date means his 1516 publications have received at least 10 citations each. Although by now we have understood the difference between the H-index and the i10-index, this slide will give you more clarity and a detailed analysis of the difference between the two using different parameters.

There is a G-index as well which is not a very popular one. It has a different calculation mechanism which was given by Leo Egghe in 2006 as an improvement of the H-index for measuring the global citation performance of a set of articles. The G-index corresponds to the highest rank for which the cumulative citation count is equal to or higher than the squared rank.

The E-index is another index which was given by Zhang and is used for excess citations. It is defined as the square root of the excess citations over those used for calculating the H-index. The index can help describe the overlooked citation information by using the

H-index alone. For example, a researcher with one paper that has been cited 100 times will have an H-index of 1. The H-core consists of only one paper in this case whereas, the E-index with this system will be 9.95.

FWCI is nowadays more important compared to the H-index in the opinion of many scientists given by the Scopus database. It gives us the actual value of the usage of our published work. Values above 1 FWCI are considered above the world average.

The H-index is not only applicable to authors but to journals as well. Varun et al gave the concept in the year 2006 of this H-index for journals. It helps in calculating the impact of journals apart from the Impact Factor given by the JCR. The procedure to calculate the H-index here is the same as for author assessment except for the period of time selected. The H5-index is the H-index for articles published in the last five completed years of a particular journal. So, it is provided by Google Scholar freely. This screen shows the H5-index of journals using Google Scholar. Not only can you see the impact of a journal through its Impact Factor or H5-index but now the Scopus also helps understand the impact of journals as you can see in this slide. This is known as Citescore apart from SJR and SNIP scores.

This is another journal metric known as Eigenfactor. A journal's Eigenfactor is basically a measure of how many people read a journal and think its content is important. Since this cannot be directly calculated it is measured by counting the total number of citations a journal receives over a five year period.

It is important to understand that in a database like Scopus or Web of Science your institution might be reflected with different variants, for example, IIT Delhi, Indian Institute of Technology Delhi, or may be some other variant. This may severely impact its visibility, impact, funding and ranking as well. As you can see in this slide, the IIT Delhi has got different name variants which have been merged to represent the true impact. In the same way an author's contribution may be reflected with different variants of the name or different Scopus IDs causing loss to the contribution and impact. Here you can raise the merging request to correctly reflect the publications and their impact.

When we say what the Impact Factor of a journal is, this actually comes from the journal citation report or JCR which is a product of Clarivate Analytics. So, this screen talks about the JCR only. Any other Impact Factor as claimed by a predatory journal is not a genuine Impact Factor. This slide shows the SCIMAGO journal and country rankings or SJR rankings which are freely accessible. SJR is a portal that includes the journal and country scientific indicator, sourced from the Scopus database of Elsevier. It ranks as per the criteria it has adopted like number of documents, citations, h-index, etc.

In continuation to the previous slide here you can see the rank of the journals, like we are seeing the rank of the journals as per the Impact Factor from the JCR. This is another way

of seeing the quality of a journal using the SJR journal rank system. Citescore is a new metric to help you track journal performance and make decisions. It is now a day considered as one of the important parameters for counting the value of a journal. It is the number of citations received by a journal in one year to documents published in the three previous years divided by the number of documents indexed in Scopus published in those same three years.

Another metric parameter from the Scopus is Source Normalised Impact per Paper or SNIP. It measures contextual citation impact by weighing citations based on the total number of citations in a given subject field. CWTS journal indicators provide free access to bibliometric indicators in scientific journals. The indicators have been powered by Leiden University Centre for Science and Technology Studies or CWTS.

This slide shows in an easy way how the Impact Factor and Immediacy Index are calculated. For Impact Factor we calculate the citations received for articles of the previous two years. Next slide will make it more clearer. Here is an example that the total number of citations received in 2023 to the papers of 2021 and 2022 is 5792 and the number of papers in these years is 40. So, the calculation is simple: the total number of citations received divided by the total number of papers becomes the Impact Factor of the journal.

This screen is self-explanatory if we want to understand the Immediacy Index calculation of a journal. Immediacy Index is readily available from sources like the Web of Science as you can see in this slide. Do not be surprised if someone is asking you if your author's Impact Factor or AIF is. Not popular, but this has been outlined in a Nature article published in the year 2014. There is a metric known as the Relatedness Index as well where we can see a journal degree of relatedness to other journals based on citation information. Altmetrics or alternative metrics measure the online readers' behaviour, network interactions with contents, and social media. It captures interest on social media, readership, discussions and so on and gives an indication of an immediate impact compared to citations.

Continuing with altmetrics, platforms like Altmetric and PlumX track online mentions, downloads, social media engagement and other indicators of attention to your research work. Integrating altmetric badges in your publications or profiles can showcase the broader impact of your work. So, this screen talks about research information management systems. Research Information Management System or RIMS is an emerging new service in the academic and research libraries. RIMS supports universities and libraries to manage their institute faculty and researcher information in a single point.

It also allows researchers to deposit and share their research information with the public access and enables the reusing of research. This slide shows the main screens of these

popular research RIMS. Some of these are paid like Pure or InCites but the free ones are also available like IRINS. This slide shows one of the most popular RIMS that is Indian Research Information Network System or IRINS. A project funded by the Ministry of Education, Government of India and executed by Information and Library Network Centre, Gandhinagar.

This is now very popular in India and most of the institutions from India either have implemented IRINS or are in the process of implementing the same. So, as far as India is concerned, we cannot afford paid databases, or RIMS, or tools like SciVal, Pure or InCites. IRINS could be a game changer for an institution. This is the landing screen of IIT Delhi's IRINS. The beauty of IRINS RIMS is that it can even give you the readymade h-index of a whole department for example, Department of Electrical Engineering, which is not available in this format from any of the paid tools as well. The individual profile in IRINS looks great where you can connect all the important academic identities like Scopus, Web of Science, Google Scholar, etc. It helps you improve your academic visibility, public perception, and research impact as well.

The website of an institute like this one of IIT Delhi and also of a unit like Central Library IIT Delhi serves a great purpose as far as the visibility and impact in academics, ranking and accreditation is concerned. Institute or unit e-newsletters serve a great purpose for the visibility and public perception including ranking and accreditation. These activities require effort, but we can start without any expenditure as well. The platform website can also be used effectively like IIT Delhi Central Library is providing e-news clipping services which are sourced from the different you can say free resources basically using RSS feed.

Circulation of useful information through press releases or news or mailing circulars can play an important role in the institutional or faculty visibility as you can see in this slide. This is the age of mobile devices everybody using a mobile device or mobile phone. So, if we are able to make any of our academic activities or research visible through the apps that will help in visibility and impact as well. It is believed that over three fourth of the content are not discoverable through any one search engines through the internet. Here the library could be of great help in finding the right content without wasting your time.

Even the AI-generative tools like ChatGPT or LLM may not necessarily find you the correct answer as you can see in this slide. Also the AI-generative contents may land you in serious trouble because plagiarism detection tools are able to identify the similarity level as you can see from the turnitin as well. Here also the library or information professionals may get you the right information at the right time and in the right format as well.

Library or right tool can help users find the right information in a minimum time as well. There are search windows like WorldCat, IndCat, Delnet or a discovery window which can find the right information about a book or other resources in the minimum possible time and in the best possible way.

You should be aware that there are other search engines as you can see here on this screen and also the meta search engines which people can use to retrieve information from the web for better results if you are not satisfied with the one search engine like Google search. Scholarly search engines like Google Scholar or BASE sometimes could be more helpful in finding relevant information. Deep-web using meta and semantic search engines like Dogpile, Exalead, or Swoogle can get you amazing results. Subject gateways provide links to information sources of a particular subject. So, for specific subject queries prefer subject gateways. There could be general subject gateways like Infoport from INFLIBNET, or a specific subject gateway like Internet Library for Librarians which may be really very useful as per your need.

Language correcting tools can help in your academic and research writing as well. These provide great help while you are submitting or revising your papers, or writing or reviewing the dissertation and thesis as there is always a scope for improvement with English not our first language in general. There are paid tools like Grammarly or QuillBot, or free tools are also available if you cannot afford the paid tools like Ginger.

Uploading preprint or post-print of your articles or other academic contents helps in academic and research visibility. It may get you really great citations or Altmetric score. Even the Scopus database has also started indexing some of these like arXiv, ChemRxiv, bioRxiv, etc. If we upload our content to an institutional repository that helps in discovering the content and in getting citations and visibility as well. Like this one from IIT Delhi using open source DSpace software in the local repository accessible globally and also in the national repository hosting Indian PhD theses known as Shodhganga. Nowadays we need to know the different styles of referencing as well as the requirements of different journals or publishing houses. Therefore, we should understand some of these tools like Mendeley, Zotero, EndNote, etc.

If you are able to offer any of the MOOCs or other types of online courses that adds a lot of visibility to your work like some platform-based courses or courses through NPTEL or courses through Coursera. If you have contents on a YouTube channel which is publicly accessible that helps a lot in academic visibility and improving your research impact as well. As you can see here from my ARPIT MOOCs course of the Ministry of Education, Government of India. The name of the course was ETTLIS, Emerging Trends and Technologies in Library Information Services. The contents became very popular and the videos were seen thousands of times.

You can make your online content more discoverable and visual by giving links from popular websites as well like your Unit website as this one is from Central Library, IIT Delhi website. The academic community or students can be helped by providing e-resources, databases or tools through remote access as you can see here. This access as per the convenience of the researchers can help in their research productivity. If you are able to retain some content on Wikipedia that becomes the most searchable and hit item for visibility and impact. But please remember that Wikipedia is not easily allowed to retain your content on Wikipedia. They have some standards and if your content is following those standards only you will be able to retain your content on Wikipedia.

Knowledge of similarity software like Turnitin, Drillbit, Ouriginal, or some other helps make you comfortable as you feel confident while submitting your content to journals or other publications. This results in more academic or research productivity. If you are able to showcase the institutional H-index and citations using databases like Scopus and Web of Science through our most used website that derives researchers interest and can make them more productive that actually helps a lot. Even if we are not subscribing to Scopus database we can explore using its API's in this regard. Research support services and outreach programs offered through libraries or academic units as you can see in this screen helps in increasing output and visibility.

These are some of the important sites which can help you a lot in improving your visibility, impact, H-index or citations and public perception as well. You need to create your profile here and keep the content updated as per the need. Some of the examples have been given in the next slide to highlight. If you have updated your official website like this one on IIT Delhi and the other one i.e., personal website Nabihasan.in, then the updated content helps a lot in your academic or research visibility. People can refer to your updated content here including publications. Personal website becomes more important when we change our institution but want to retain the content which we have created with a lot of effort.

ORCID is one of the most important academic unique IDs like an Aadhaar in India for each researcher. This helps in many ways and in fact is a requirement while submitting your research to many of the journals or agencies. Creating Vidhwan profile which is a Ministry of Education project if your institute has not implemented the IRINS RIMS helps as well as you can see here.

A profile on Academia.edu can help you even with your lesser known but published or unpublished contents. Like Academia.edu, ResearchGate can also help you with your lesser known published or unpublished contents including providing you with the citations and H-index. You can add your publication to the Web of Science profile even if these are not indexed as well. Google Scholar can get you the maximum citations and H-index. So, keep your profile active and updated. It also gets you an i10-index as well.

Create your profile and share slides on slideshare for better visibility and impact. You can explore Figshare and improve your research profile and its impact. Platforms like Kudos help the research community to communicate for impact to ensure that knowledge is found, understood and applied by a broad audience through social media. It is a social network where we can show our research visibility track from social networking sites and much more.

Judicious use of social media or networking for a unit or institute and also for your own profile can help a lot in academic visibility and impact. Even if you are not a celebrity but have created a profile on important sites as being discussed here then you can receive great hits including on Google search as you can see in this slide. Marketing is very important in this world and is applicable to academicians or library professionals as well. Sometimes you are doing great academic or research work but not able to convey to those who matter for this work. Therefore marketing is also important and it can help in the greater use of your content.

You can have better partnership with peers and can get adequate funding or projects and can maintain a central position in the administration and supportive authorities. You can adopt various ways of reaching the people or for marketing as per the need like through social media, altmetrics, or mapping sites or through personal selling. Collaborative projects or collaborative research especially inter-institutional or interdisciplinary helps a lot in academic recognition and impact of the research. Collaboration with people from other countries becomes more special. Now we have various interesting data visualisation tools through which we can present our research or its impact in a better way instead of using simple Excel like VOSViewer, Tableau, Plotly, etc.

Use of these tools can leave a really great impact on your research work on the audience. However when it comes to publications our aim should always be to publish our academic or research work in publications or journals widely indexed for example, indexed by Scopus, or Web of Science, or at least should be online accessible like journals indexed by Directory of Open Access Journals. This slide further highlights the importance of publishing in an open access model and reiterates that this model of publishing gives you a lot of visibility, impact and citations as well. For researchers or academicians citations matter a lot. These two slides can help you as how you can improve your citations like use a unique name consistently throughout the academic career, or a standardised institutional affiliation and address, or assign keywords or buzzwords to the manuscripts.

With this I would like to sum up that the resources, services, products and case studies presented in this PPT are very useful for a researcher or analyst or academician or information provider if used and explored further and can serve a great purpose in maximising the academic visibility of individuals and institutions. Remember that while

these tools can enhance the visibility and impact of your research, the quality and significance of your work remain the primary factor that determines its influence. So, before I say thank you to the learners for their interest and patience in this long lecture I wish to acknowledge that this lecture has been prepared from different resources to help learners understand the topic for academic and research use. I duly acknowledge the IITD Library team for their contents, websites, colleagues, scholars and other website content providers whose material have been used in this lecture.

Many of these slides have been used earlier as well in my other presentations. These concepts with useful applications and interesting examples will be further covered in detail by my colleagues as part of the NPTEL Course on Science Communication. Feel free to contact me by email as given in this slide that is hasan@library.iitd.ac.in or visit my website for more details. Thank you and happy learning. Thank you.