Envisioning the Future of Library in the Post-Coronavirus Era through Web Scale Discovery System: Experience and Expectation

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Abstract:

Web Scale Discovery System (WSD) is the nascent information search and retrieval for the hybrid library environment. Especially in the pandemic period this system will help the students and research scholars residing in home and doing eLearning through online classes etc., It has so many special features like which allows users to discover content from the full range of library holdings (including A&I databases) and web resources in a single search, providing fast results, with relevancy ranking, faceted results browsing, content suggestions, full-text linking, and a variety of social and reference-management features. In addition, there are detailed metrics and reporting for institutional use. This article will describe the implementation experience of India's pioneer medical institute All India Institute of Medical Sciences (AIIMS) central library resources utilization and its economic impact. Usage statistical analysis by above mention facets will be discussed and suggest the viable options and expectation of the discovery system in post coronavirus period. The objective of this paper will emphasis the essential feature of discovery system and its effectiveness in return of investment (ROI) focusing on E-resources dominated budget system in this digital era.

Key words: web scale discovery system (WSD); EBSCO discovery Software (EDS); E-Resources of Medical Libraries

Introduction:

Google generation readers in the electronic environment with ubiquitous availability of internet networking in current information ecology, readers are become paper readers to screen readers with various kind of digital devices such as desktop, laptop, tablets and smart-phone. They keen to have a search engine in the library also with customization of library resources. With the results library come across with various resources discovery tools federated search engine to the web scale discovery service (WSD).

Before going to explain about the future of Web Scale Discovery services, I would like to share professional experience in search and discovery of information at our workplace. One of my favourite subjects in library science is the Information Storage and Retrieval. The term information retrieval was coined by Calvin Moores from that onwards research and development in this domine stayed developing tools. That tools from punch cards by Henry

P. Stamford and descriptor, (now known as index term or metadata tag) then online searching this made searching quite stressful. In 1994 my experience at corporate library on Dialog Database (Online) with Knight-Ridder search charged by the minute. Mistakes are costly in time and money. So I do spend an hour or more in the library before handling, consulting printed thesaurus for descriptors, considering how to combine Boolean operators most efficiently, and plotting our overall search strategy. That time computer's time was more precious than a human's, so I sweated every keyword. Then we want further research on effectiveness and measurement of search. Precision and Recall, our most basic measures tool arisen. Precision measures how well a system retrieves only the relevant documents. Recall measures how well a system retrieves all the relevant documents. The relative importance of these metrics varies based on the type of search.

The way that libraries organize and manage their resources has also changed along with the formats of resources to which libraries provide access, advancement of information technology, the development of tools, such as integrated library systems (ILSs), and metadata standards that are used for recording bibliographic information, storing cataloguing records, and employing them in search and discovery of resources that libraries hold. For distinguish search and discovery Sadeh's (2013) distinction between search and discovery i.e., "traditional library catalogues and databases constitute search systems, as they offered structured search interfaces tailored to the specific data they hold. Bibliographic records tend to be homogeneous, as they are constructed with the same metadata standards: these systems expect users to possess good searching literacy. Discovery systems may not offer searchers the same options to describe their information needs in detail (e.g.,via the use of controlled vocabulary) but instead offer them simple search interfaces complemented with multiple post search options for assessing findings, refining results, and navigating to other results of possible interest. "Providing access to resources is increasingly challenging as libraries offer information resources in all formats. Library users' expectations and needs require to provide an easy way to access all these collections in a comprehensive manner. Millennial generation users start with simple searches and use facets to limit their results (Diamond, Price, and Chandrasekar 2013; Duranteand Wang 2012). Users work with idiosyncratic methods and favourite tools that might not be the most efficient but are comfortable for them. It is our job to figure out what works for our users and either adapts our systems accordingly for to teach them better practices (Daigle 2013). So we arrived the latest information retrieval tool called web scale discover service (WSD). what is Web Scale Discovery (WSD) Service?

The term "discovery" means by Carter (2011) yields the following definitions:
Something learned or found; something new that has been learned or found
The process of learning something; the fact or process of finding out about something for the first time.
The process of finding something; the process or act of finding something or somebody unexpectedly or after searching.
The way we think about discovery with our goal of finding recorded information exhaustively, expeditiously and pin-pointed for use of the researcher to develop the discovery

system should have Chang's five general browsing themes of discovery behaviour in digital environment;

1. Looking for a specific item, to locate
2. Looking for something with common characteristics, to find "more like this"
3. Keeping up-to-date, to find out what's new in a field, topic or intellectual area
4. Learning or finding out, to define or form a research question
5. Goal-free, to satisfy curiosity or be entertained.

Grave's concepts of Web-scale discovery:

- Web-When one thinks of a web, one might think of a spider, a browser, or a page among many possibilities. These words associated with web seem to indicate the need for communication as relayed in the iconic story of Charlotte and Wilbur. We communicate on the Web through browsing or searching for something we perceive we need; we communicate through paging or paging by others. For example, we page a person and we call up a Web page about a person or a business.
- Scale-it means to climb, ascend or attack. It can also refer to a thin membrane, a protective covering, or an apparatus used for weighing or balancing.
- Discovery-It means the finding out or bringing to light of that which was previously unknown; uncovering; disclosing; revealing; divulging.

When one puts the words all together, Web-scale discovery, one can think of it as the Web being a container of information that people are scaling, attacking or searching to discover resources that support their learning, teaching, and research. We can help with the discovery process and provide a landing place to interpret and analyze the wealth of discovered resources. Web-scale discovery is a pre-harvested central index coupled with a richly featured discovery layer providing a single search across a library's local, open access, and subscription collection. According to Vaughan (2011) Web Scale discovery is "Harvested content is normalized into an underlying schema, developed by the discovery service vendor, that facilitates indexing, relevancy ranking, and an even level of presentation for different content types with potentially varying levels of metadata."

Web scale discovery services are a tool with major potential to transform the nature of library systems. These services are capable of searching quickly and seamlessly across a vast range of local and remote content and providing relevancy-ranked results in the type of intuitive interface that today's information seekers expect. Discovery Services are systems that harvest and pre-index a wide variety of library content from separate sources (records from library databases, the online catalog, perhaps the local institutional repository or other locally developed databases), build one giant index of all that content, and provide near-instant, relevancy ranked results through one search box (Vaughan 2011, Adams et. al. 2013). Web Scale Discovery Service search library collections the way Google searches the web; by searching the entire breadth of content available in library's collection" (Fry 2013)

This paper describes the the Web Scale Discovery service implementation at Dr. B.B. Dikshit Library, AIIMS, New Delhi and usage efficiency in the remote access environment. It starts with needs and important of Discovery Service in the hybrid nature of collection development in medical library. Explain the implementation process in various steps for establishing the Single Point Search solution for accessing and retrieving of library resources. It also explains the various search techniques and the indexing components for ease of doing literature search in the electronic environment similar to ordinary web search engine. It will narrate and emphasize the essential characteristics of discovery services for information processing to the next generation students doctors and research scholars. This study briefly narrates the tools feature which is counterparts of web such as central index, relevancy based search results. Faceted navigation and user-generated content as well as the information organization components and its functionality: End user interface, interoperability, local search and retrieval, ability to communicate interactively and access to remote index platform etc. It concludes with the economic viability and return on investment based on the usage statistics of this resource discovery services.

Implementation of EDS at BBDL

As per the NISO definition of discovery services as those library applications that provide a single search box to access a central, pre-indexed database of institutional holdings. These tools are becoming popular all over the world. It is a current technology in information retrieval paradigm crossing the federated search system from the year 2010. Moreover after release of the SAGE white paper in 2012, adoption of web-scale library discovery services offering single search box solutions has grown steadily. The same approach has been adapted in Dr.B.B.Dikshit Library to frame Single Point Search i.e, iSearch@B.B.Dikshit Library that offers a gateway to the library resources. Single Point Search is a powerful, fast, simple and comprehensive way to discover full text EResources (E-Journals, E-Books and Catalogue) available through our library subscription and beyond. It provides a unified platform for AIIMS users to access and search from all the library resources to get single set of results with de-duplication by providing a Google-like search. It is developed through EBSCO Discovery Service (EDS).

The main function of SPS is "Content harvested from local and remotely hosted repositories to create a vastly comprehensive centralized index—to the article level—based on a normalized schema across content types, well suited for rapid search and retrieval of results ranked by relevancy. Content is enabled through the harvesting of DR.B.B. Dikshit Library subscribed resources combined with agency agreements with publishers and aggregators allowing access to their metadata or full-text content for indexing purposes".

What is Single Point Search (SPS) or iSearch@B B Dikshit Library?

Single Point Search is a powerful, fast, simple and comprehensive way to discover full text EResources (E-Journals, E-Books and Catalogue) available through our library subscription and beyond. It provides a unified platform for AIIMS users to access and search from all the library resources to get single set of results with de-duplication by providing a Google-like search. It is developed through

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Fig.1: i-Search@ Dr. B.B Dikshit Library

Silent Features of i-Search@ Dr. BB Dikshit Library

The user friendly searching interface is helpful tool for researchers to get the most relevant result with the following features:

- A unified platform to search all the library resources including Subscribed, Open access and local collections such as the library catalogue and institutional Repositories.
- Connections to direct full text links.
- Full featured user-friendly interface.
- Google like single search window.
- User can easily print, edit and save searches as well as create journals search alerts.
- Researcher can create and manage personal folders to save, store and export searches.
- User can share any search result permalink to other researcher through social media.
- Relevance ranking across entire results.
- I-search@ Dr. BB Dikshit Library platform supports nine unique style (citation formats — how to cite) such as — AMA, APA, Harvard, Vancouver, Chicago etc.
- Single results list from all collections.

PICO Search: The PICO process is a technique used in evidence based practice to frame and answer a clinical or health care related question. The PICO framework is also used to develop literature search strategies. The PICO acronym stands for

P – Patient, problem or population
I – intervention
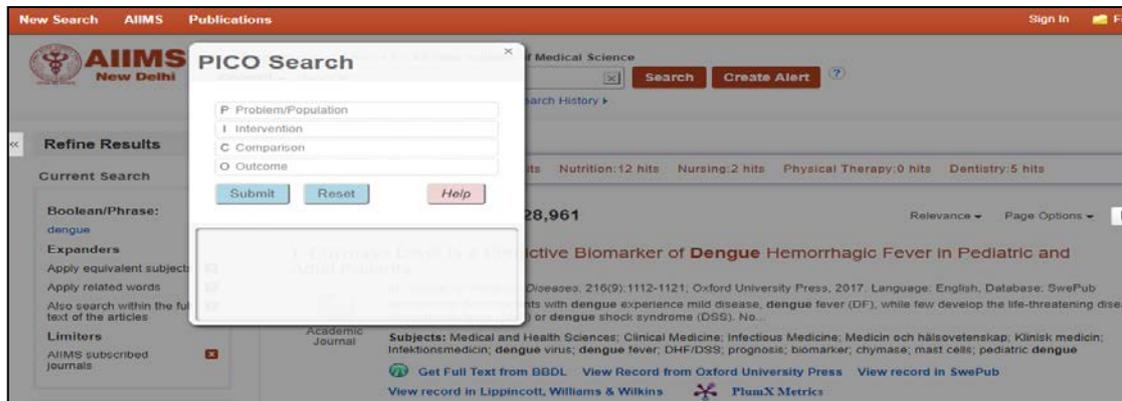**C** – Comparison, control or comparator
O – Outcome

Fig.2: PICO Search

Comparison between i-Search @Dr. BB Dikshit Library & PubMed:-

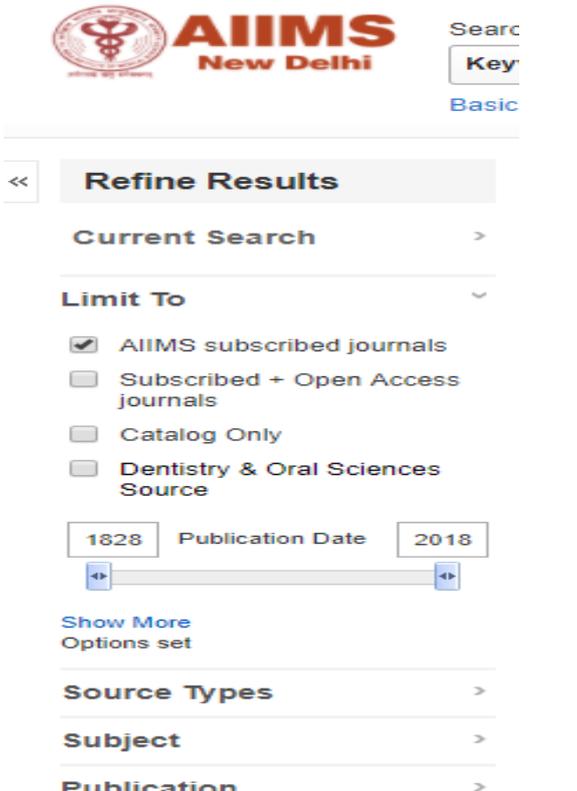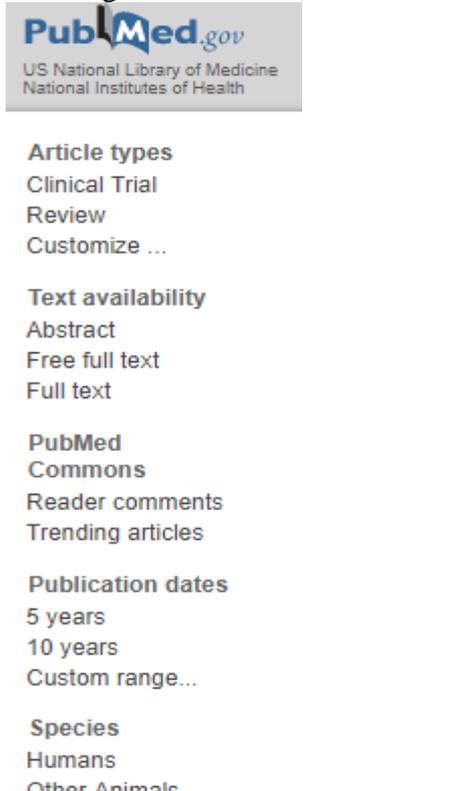| S. No.	i-Search@Dr. B.B. Dikshit Library	Pubmed
1.	Full text articles can be accessed from subscribed library resources.	Only article abstract available.
2.	Its support to IP based access and Integration with Remote access technologies (e.g. OpenAthens etc.)	It can be accessed anywhere with private network also
3.	This feature is not available in this platform.	Clinical Trial & Review filtering is available from search results
4.	This feature is not available in this platform.	Top Trending articles can be finding on the basis of recent user search.
5.	Possible to limit search to peer reviewed articles.	Peer reviewed article filtering is not available
6.	Integration of Library Catalogue and subscribed database is possible	The provision of Integration of Catalogue and other database is not available
7.	Integration of subject indexes is possible through platform blending	This feature is not available in this platform.
8.	It can be searched sentence, paragraph or whole page through SmartText Searching feature.	This feature is not available in this platform.

| 9.	More features for narrow downing the search results **AIIMS New Delhi** Search Key Basic « **Refine Results** **Current Search** > **Limit To** ⌄ ☑ AIIMS subscribed journals ☐ Subscribed + Open Access journals ☐ Catalog Only ☐ Dentistry & Oral Sciences Source [1828] **Publication Date** [2018] Show More Options set **Source Types** > **Subject** > **Publication** >	Limited features for narrow downing the search results **PubMed.gov** US National Library of Medicine National Institutes of Health Article types Clinical Trial Review Customize ... Text availability Abstract Free full text Full text PubMed Commons Reader comments Trending articles Publication dates 5 years 10 years Custom range... Species Humans Other Animals

Table. 1: Comparison between i-search @Dr. BB Dikshit Library & PubMed

When using PubMed user always get latest information and can update yourself about latest trends happening in medical field but cannot access the full text articles download through PubMed because it's a very popular indexing database of medical publication worldwide. It covers only free full text articles and provides only abstracts with direct full text link to publisher's sites.

Discovery Interface of "Single Point Search"

This discovery interface has administrative aspects of customize the various types of library branding elements like colour and logos, and specify some layout details such as position of logos and choose to have a custom toolbar at the top of the interface. We add the elements according to our requirement in the toolbar such as Folder, Language, and Sign in, New Search etc. In addition, we provide custom text at the bottom of the interface.

Figure 6: Single Point Search User Interface
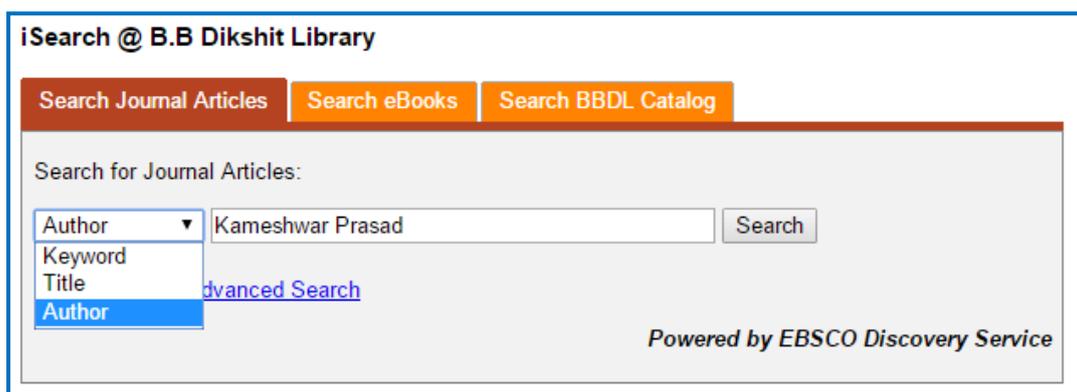
It offers single search box with advanced search hyperlinked below. Advance search takes you to the advance window having Boolean search, find all the search terms, find any of the search terms, and so on. In addition users can indicate if they wish to display only results with linked full text, or scholarly or peer reviewed journals. Users can also search by title, author and indicate a publication date range. The Advance search mode provides the ability to conduct fielded searches and the use of Boolean operators via pull down menus (Figure 1 and 2). Advanced searching supports:

- Searching with Boolean operators

- Proximity searching

- Quotes/phrase searching

- Truncation

- Wildcards and many more ….

Advance options include various search modes that can be applied by a user such as: "Find all my search terms" "Find any of my search terms" and "SmartText Searching". Limiters in the advanced mode allow users to refine searches to a particular field in the index (TX-All text, AU-Author, Ti-Title, SU-Subject Terms, SO-Journal Title/Source, AB –Abstract, IS-ISSN, IB-ISBN). We can expand the searches to apply related words and search within the full text of journals, eBooks etc.
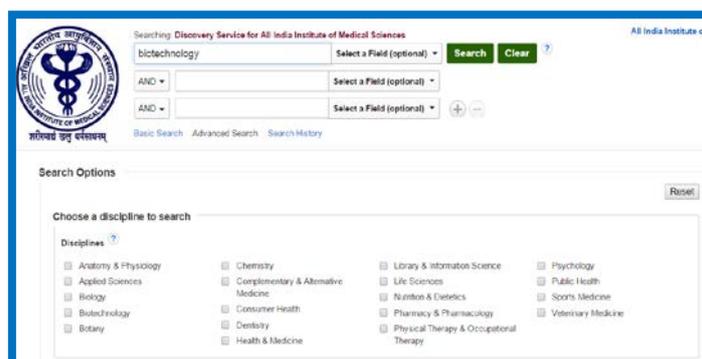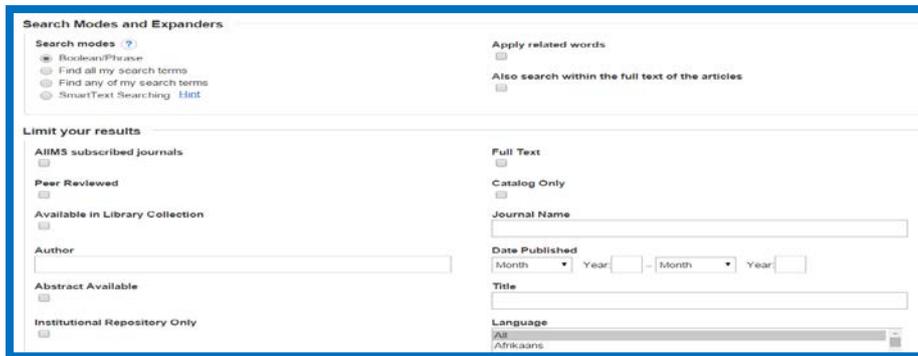
Figure 7: Advance Searching Facility in SPS

Figure 7.1: Advance Searching Facility in SPS


Search Result Interface

Once a search is conducted the full interface is displayed and this interface is divided into a large central section and 2 vertical panes having limiters for further refinement of results and links to other important databases. By default, items are ranked by Relevancy, other sort options are chosen by pull down menu include Date Newest, Date Oldest. The user can also define various Page option. Majority of the Discovery service interface contains Results from a search. Each content type such as journal, Book, Articles has a unique icon.

Click the single record to get full information about the record. Link to full text is also provided which takes you to the publisher's website and gives full text (if full text is subscribed). For physical books present within the library, the detail view provides typical citation information (title, author, source etc.). For journal article, the detailed record view contains information about author, title, source, subject term, abstract etc. Full text can be read through Full text finder link.

Faceted Navigation and Search Refinement

Single Point Search offers various search refinement methods, including faceted navigation**.** The left hand side pane is used to refine results with various filters and limiters and the right hand pane is used to incorporate various other databases. Limit your search to AIIMS subscribed Journal or Open Access or Catalogue only. Here AIIMS subscribed journals are set as default setting. Further result can be refined by source type, publication date, subject, publisher, publication, subject, language, geography, location, content provider.

Figure 5: Refining the results in SPS
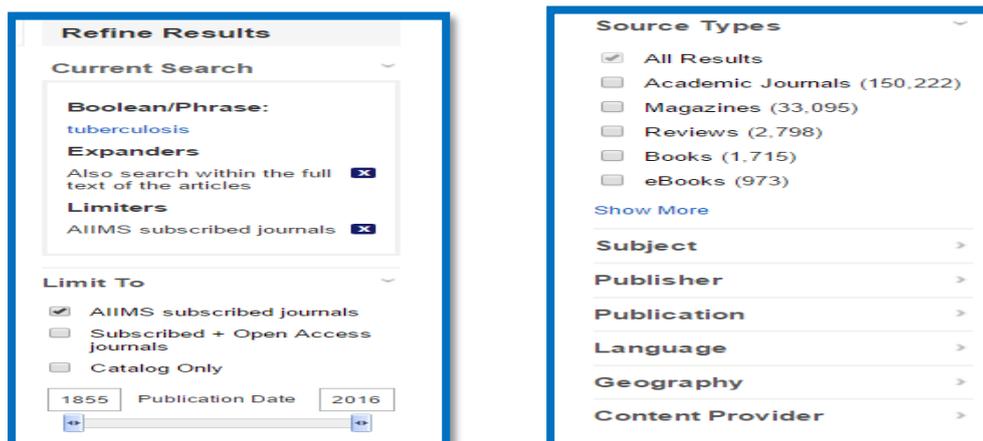
Simultaneous search in all B. B. Dikshit Library Databases:

While you perform the search in Single point search it simultaneously federated the same key word search to all subscribed databases such as point of care database like UpToDate, BMJ Best Practice, BMJ Case Report and PubMed which are listed in the right panel important link, for example "Tuberculosis" in other Databases by just clicking the database link at the right side bar.

Figure 6: Simultaneous search on subscribed databases
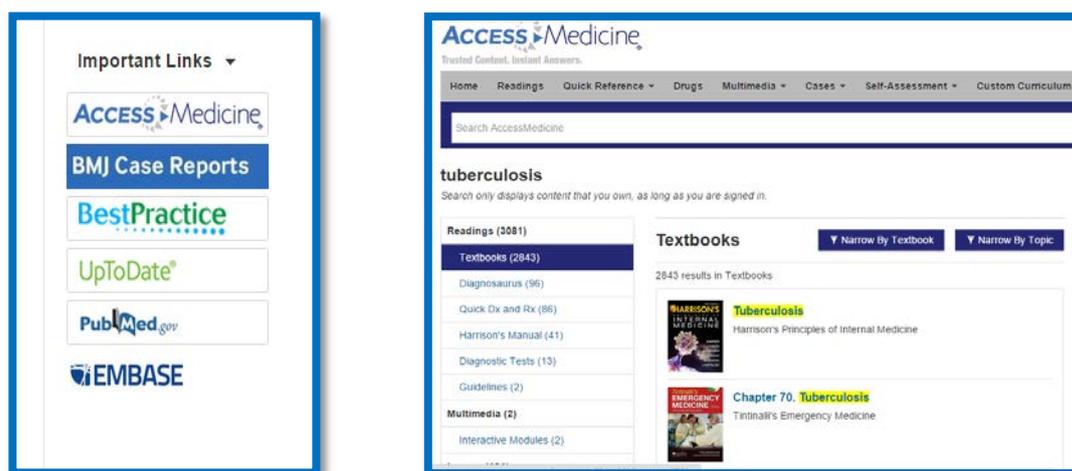
Personalisation of Library:

Personalisation of your search and search alert through email can be done in SPS. To manage the your searches, you can create a personal folder in Single Point Search, which is accessible by the ID and password and from any interface screen. Document of your intrest can also be added to a folder for futurereference. Using options available through your personal folder you can:

- Save preferences

- Organize your research with folders

- Share your folders with others

- View others' folders

- Save and retrieve your search history

- Create email alerts and / or RSS feeds

- Gain access to your saved research remotely

After adding to a folder documnet can be saved in various standard file format and in different Citation Formats such as ABNT, AMA, APA, Chicago etc

Sharing, Export and RSS feeds

Result articles or books or any other documents can be shared through E-mail by just clicking the sharing option at the top of the result page. It also offers variety of export options such as printing, email, saving, and exporting to a citation management program such as

Endnote, Procite, RefWork and BibTex. Users can save citations to a file format: direct export to Endnote, Mendely etc. or save to xml, Bibtex format or MARC 21 format.

Preparation of various format of bibliographic record:

After the literature search in SPS we can make the bibliographic list with different standard formats such as AMA and Vancouver. Select the relevant articles and then open the folder, all the selected search results will be going to the respective folder.

Conclusion:

In Pandemic environment the information becomes distributed, diversified, and open, library reader prefers web-scale discovery tools that aggregate resources from a range of sources over the library traditional collection born and scanned digital resource from the repositories etc., Most importantly the research and development output in scholarly form nowadays has three interrelated challenges for library discovery. One the types of information researchers seek is changing. Second what researchers intend to do with that information is changing. Thirdly, How the researchers go about looking for that information is changing. Based on these panoramic view Web-Scale Discovery service (WSD) is the right solution to envisioning the future of library in the Post coronavirus era.

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