

Exploring the Usage of Research Utility Tools for Research Communication: An Overview

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ABSTRACT

Research usability tools for information access to optimize scholarly workflow/digital innovations in academia have become essential for all research scholars. Researchers can unlock their research potential and address complex challenges more effectively using research utility tools. This study aims to shed light on the role, usage, and perceptions of research utility tools among researchers to enhance their research experience and productivity. This study explores digital aids/tools to streamline scholarly research processes and analyze how utility tools improve a researcher's research experience. Thus, effective research utility integration redefines academic workflows.

KEYWORDS: Research utility tools, Reference Management Software, Academic Social Networking Sites, Web Discovery Platforms.

INTRODUCTION

Research communication is crucial for disseminating scholarly work, knowledge sharing, and advancing science and academia. As the research landscape evolves, efficient and practical tools are needed to facilitate the various stages of research communication. In the digital era, researchers have various tools to simplify literature search and discovery tasks, reference management, citation checking, plagiarism detection, etc. The availability of these tools not only streamlines the research process but also enhances the quality and impact of research output (Childress, 2011). This study explores the significance of such tools, delving into their benefits and functions and how they contribute to the broader ecosystem of research communication. Utilizing research utility tools improves data analysis, organization, and documentation (Ali et al., 2016). When research scholars are equipped with the knowledge of using the right tools, they can enhance the quality of their research by employing advanced techniques for data collection, analysis, and visualization (Joo & Peters, 2020). Thus, research utility tools ultimately contributed to the credibility and reliability of the research findings.

Many research utility tools offer collaboration features that allow researchers to work together on projects irrespective of geographical distance. By fostering such tools, this study can promote collaboration among research scholars, enabling them to share resources, exchange ideas, and jointly contribute to knowledge creation (Ali, Zehra, Vaidya & Mohsin, 2022). Thus, integrating practical research utility tools into research reshapes academic workflow. Through an examination of various categories of research utility tools, including academic social networking sites, citation generators, literature search and discovery platforms, reference management software, collaboration and project management tools, data analysis and statistical software, survey and questionnaire tools, and writing and editing software, this study aims to provide a comprehensive understanding of their roles in the research communication landscape. Research utility tools often automate and expedite various research processes, saving valuable time and resources. The study has the potential to bridge the gap between the availability of research utility tools and their effective utilization among research scholars. This study provides an overview of the use of research utility tools in research communication. It sheds light on the benefits and functions of these tools that aid researchers, Academics and Professionals in their endeavours.

This study can improve research practices, inform university policies, foster collaboration, and contribute to broader discourse on technological integration in academia. When research scholars become proficient in using these tools, they can conduct their studies more efficiently, leading to cost savings and faster research progress.

2. SIGNIFICANCE OF THE STUDY

Research utility tools skills are essential for every researcher to access updated information resources and services. As technological tools have become integral to research, this study contributes to the evolution of research methodologies. This demonstrates how researchers adapt to and adopt new tools, potentially leading to research practices and approach changes. This study aimed to assess the use of research utility tools by research scholars. This study can enhance research productivity and efficiency by identifying the gaps in knowledge and utilization. The field of research is continually evolving, and technology plays a crucial role in shaping research methodologies. Investigating research utility tools can help researchers stay current with the latest technological advancements, ensuring they remain competitive and relevant in their research. This study explored such tools' importance, benefits and functions and how they contribute to the broader research communication ecosystem. After screening several kinds of literature on research utility tools, it was noticed that there were only a few studies on the use of research utility tools in research. Still, this study covers one or two research utility tools. Thus, this is the first study that made an attempt to explore the different types of prominent research utility tools respective to their categorization in research communication.

3. LITERATURE REVIEW

Ali, Zehra, Vaidya and Mohsin (2022) explored several factors that promote Knowledge Sharing and Research Collaboration among Research Scholars in academics, showing the increasing role of Academic Social Networking Sites in research work. Academic Social Networking Sites have become prevalent among researchers and scientists for offering different specialised platforms regarding the research metrics and several indicators to assess their research performance, convey among peers and the university's overall ranking.

Childress (2011) studied Citation Tools in Academic Libraries with best practices for reference/citation managers and library instruction. The researcher felt the need to help users write and format citations; librarians should recommend reference management software such as Endnote or RefWorks and discuss its importance in the research workflow.

Donner (2023) conducted a systematic literature review on research data management systems in organizational processes. The study revealed that the implementation of research data management systems is strongly impacted in research institutes. To strengthen the organizational structure of higher education institutes (HEI) and library infrastructure (to enhance the service profile of libraries), users need training, Education, and strategic considerations. This study provides valuable insights into the research data management systems, which could be one brick for developing the open data/science movement.

Hase, Gaikwad & Jadhav (2021) conducted a Case Study of the Rajarambapu Institute of Technology on the online databases backbone for teaching and research communication. Their study suggests significant use of online databases throughout the research workflow, from categorizing research prospects to disseminating results. The study results indicate that libraries use social media to deliver varied user services, disseminating the institutions' scholarly output.

Maurya & Subaveerapandian (2022) carried out a survey of Asian Library and Information Science faculties' experiences in the research data preservation practices and curation during their research. They found that most LIS faculties have adequate skills and knowledge on research data curation and preservation, even though they expect more services like data discovery, data preservation, data sharing /dissemination, and data visualisation from their academic institute libraries.

Singh, Mahawar & Singh (2022) have surveyed the use and awareness of Reference Management Software among the Research Scholars of Central Universities in North India. They investigated the availability and capabilities of reference management tools for personalized use in research. The study revealed that researchers are familiar with Mendeley and Zotero reference management software.

Subaveerapandian (2022) analyzed the researcher's opinions toward plagiarism detection tools as a Creator or Destroyer for Effective Writing. This study has shown that plagiarism software tools are essential to detect similarities in texts and avoid future consequences, avoid/detect duplication and maintain the originality of research. Further, this study also suggested that if the researchers are experienced in scientific and technical skills, they can easily avoid plagiarism. The study further revealed that using plagiarism detection tools creates effective writing in research.

Teixeira da Silva (2020) discussed Open Researcher and Contributor ID (ORCID) concerns about its use for academic purposes and research integrity. It allows for specific scholarly activities involving individual and collective initiatives and collaborations, such as research, funding or publication. Issues identified in this study are academic freedom and unfair treatment of people without ORCID. These include inconsistent implementation of ORCID among co-authors. These empty ORCID accounts need to be more informed and, therefore, of limited use and admirable misuse of ORCID to register potentially counterfeit elements. ORCID provides a unique digital identifier that can be linked to a researcher's publications, ensuring accurate attribution and making it easier for others to find their work.

4. OBJECTIVES OF THE STUDY

The objectives of the study are as follows:

- ✓ To identify and enlist the prominent research utility tools useful to the researchers.
- ✓ To explore the various benefits and functions of identified research utility tools.
- ✓ To know the prospects and challenges associated with research utility tools.

5. RESEARCH UTILITY TOOLS USEFUL FOR RESEARCH COMMUNICATION TO THE RESEARCHERS:

This study provides valuable research utility tools. Nowadays, academicians, researchers, teachers, and students use different innovative/smart tools to conduct their research smoothly. Research Utility tools are crucial for strengthening academic and learning endeavours in the research context. The use of intelligent utility research tools impacts research activities. Various applications of innovative research utility tools are based on research activities like data collection, analysis, collaboration, and data organisation. The researcher categorized numerous utility smart tools to assist researchers in their work (**Table 1**) significantly.

Table 1: List of Research Utility Tools with its Benefits/ Functions

Sr. No.	Research Utility Tools	Benefits/ Functions of Research Utility Tools for Research Communication
1.	Academic Social Networks (Examples- ResearchGate, Mendeley, Academia.edu, ORCID, Publons, Google Scholar Profiles, SSRN, etc.)	Academic Social Networking Sites (ASNSs) are created for researchers to set up their profiles, upload their scholarly publications, and convey them to peers. Research-related activities, such as showcasing their academic work, leading to collaborations and networking opportunities, Publication Discovery, Citation Tracking, supporting open access initiatives, offering reference management features, participating in multidisciplinary projects, publishing in journals, and contributing most to scholarly reputation, are in vogue.
2.	Artificial Intelligence/ AI-Based Smart Tools (e.g., Dimension AI, Scite.ai, Scholaracy, Trinka, etc.)	Artificial Intelligence (AI) based tools are crucial for strengthening academic and learning endeavours. AI in the research community holds great promise in increased efficiency, improved accuracy, enhanced objectivity, updated references and time-saving capabilities.
3.	Citation Generators (e.g., Citation Machine, Citefast, Cite This For Me ZoteroBib, etc.)	Citation generators can be valuable tools for anyone creating citations and bibliographies efficiently and accurately. Citation generators ensure that citations are formatted correctly and consistently according to a specific citation style (e.g., APA, MLA, Chicago, Harvard). Citation generators reduce the risk of citation errors, which can lead to plagiarism or lower grades on academic assignments. It often supports multiple citation styles, catering to

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		different academic disciplines and publication requirements.
4.	Data Analysis and Statistical Software [e.g., SPSS, R, Python, Stata, SAS (Statistical Analysis System), etc.]	Data analysis and statistical software are essential tools for researchers, data scientists, and analysts to process, analyze, and interpret data. The choice of data analysis and statistical software depends on the research field, project requirements, user expertise, and budget constraints. Researchers and analysts often use a combination of these tools to address the different aspects of data analysis and research projects.
5.	Data Visualization Tools (e.g., Tableau, Plotly, Excel (with data visualization add-ins), Google Data Studio, etc.)	The most important feature of a data visualization tool is that it is an easy and rapid way to convey messages and represent complex objects. Visualization tools display relevant information when hovered over it; zoom-in and out panels should be there; visualization should adapt itself at runtime if we select a subset or superset of data. Data Visualization and Analytics play a vital role in decision-making in scholarly research and lead to new opportunities in the visualization domain, representing innovative creativity for solving big data problems via visual means.
6.	Literature Search and Discovery Platforms [e.g., PubMed, Google Scholar, IEEE Xplore, ArXiv ScienceDirect, Scopus, Web of Science, JSTOR, ACM Digital Library, SSRN, ERIC (Education Resources Information Centre).]	Literature search and discovery platforms play a crucial role in facilitating academic research workflows, knowledge dissemination, and scholarly communication across diverse fields of study. Literature search and discovery platforms provide easy access to scholarly resources and support practical research processes. Researchers can leverage these platforms to access and keep updated with the latest developments in their respective areas of interest.
7.	Note-taking and Organization Apps (e.g., Evernote, OneNote, Microsoft To Do, Google Keep etc.)	Note-taking and organizational apps are essential for individuals who want to streamline their digital note-taking, task management, and information organization processes. Note-taking and organization apps offer a range of features to cater to different user preferences and needs, helping individuals stay organized, productive, and efficient in managing their information, tasks, and notes. Users can choose an app that aligns best with the workflow and requirements.
8.	Online Research Databases [e.g., JSTOR, IEEE Xplore, SpringerLink-Wiley Online Library, ScienceDirect, Scopus, Web of Science, JSTOR, ACM Digital Library, ERIC (Education Resources Information Center), etc.]	E-Resources accessed through Online Databases are the best information source for research scholars at this crucial phase. Access to E-Resources from Online Databases is a back boon for academics. Researchers can access various e-resources (E-Books and E-Journals) on several subjects to select from among multiple Indian and foreign publishers.

9.	<p>Plagiarism Detection Software (e.g., Turnitin, Copyscape, DupliChecker, Urkund / Ouriginal and Grammarly Plagiarism Checker, etc.)</p>	<p>Plagiarism detection software is crucial for maintaining academic and professional integrity by identifying plagiarism in the written content. Plagiarism detection software compares submitted text with a vast database of existing content to identify similarities and potential instances of plagiarism. These tools can detect various forms of plagiarism, such as copy-pasting, and more subtle forms, such as paraphrasing without proper citation. They help to maintain academic and professional integrity, uphold ethical writing standards, and encourage originality in content creation. These tools often provide educators and writers valuable feedback and resources to improve their writing skills and citation practice. Offers explanations and educational resources to help users improve their writing skills and avoid plagiarism.</p>
10.	<p>Reference and Citation Checkers (e.g., Grammarly, ProWritingAid, Citefast, EndNote, Mendeley, Zotero, etc.)</p>	<p>Reference and citation checkers help writers, researchers, and students to ensure the accuracy, consistency, and proper formatting of references and citations in their documents. Reference and citation checkers ensure that references and citations in documents adhere to specific style guidelines, such as APA, MLA, Chicago, and others. These tools help users avoid unintentional referencing errors and maintain the credibility and professionalism of their work. Many of these tools also integrate with word processors and other writing software, allowing users to insert and format citations within their documents seamlessly.</p>
11.	<p>Reference Management Software (e.g., EndNote, Zotero, BibTeX, Mendeley, RefWorks, etc.)</p>	<p>Reference management software is essential for researchers, students, and academics to efficiently organize, store, and cite references and bibliographic information. These tools streamline the management and formatting of citations and references in academic papers, theses, and other scholarly works. Reference management software includes reference collection and organization, citation generation in various styles, integration with word processors and other tools, collaboration features, and PDF management (in some cases). These tools significantly streamline the research and writing process by ensuring proper citations and reducing the manual effort required to manage references and bibliographies. Researchers and academics can choose the best tool based on their needs and preferences.</p>
12.	<p>Research Collaboration Tools (e.g., Microsoft Teams, Slack, Mendeley Groups, SharePoint,</p>	<p>Research collaboration tools facilitate communication, coordination, and teamwork among researchers, academics, and professionals working on research projects. These tools help to streamline</p>

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	etc.)	collaboration, data sharing, and project management. Research collaboration tools include real-time communication, file sharing, document collaboration, spreadsheets, and project management. Researchers and academics benefit from these tools by enhancing their ability to collaborate, share information, and coordinate activities regardless of geographical location. The choice of a specific collaboration tool often depends on the particular needs and preferences of the research team, the nature of the project, and existing software ecosystems within the organization.
13.	Research Project Management Tools [e.g., Smartsheet, Trello, Asana and Teamwork, Google Workspace, Dropbox etc.)]	Research project management tools are essential for planning, organizing, and tracking the progress of research projects. These tools help researchers, academics, and professionals to collaborate effectively, manage tasks, and meet project deadlines. Research project management tools offer various features and functions that meet the needs of research teams. Users can choose a tool that aligns with their project requirements, preferred project management methodology (e.g., Waterfall), and collaboration preferences. Practical project management tools help to streamline research processes, improve communication, and enhance project efficiency.
14.	Research Writing and Editing Software (e.g., Scrivener, Grammarly, LaTeX, Google Docs, WPS Office Writer etc.)	Research writing and editing software is essential for researchers, academics, and writers to create and refine research papers, manuscripts, and other written documents. (e.g., Google Docs is a cloud-based word processing software that enables real-time collaborative writing and editing). The choice of research writing and editing software often depends on factors such as the writing style, typesetting system, collaboration needs, document complexity, and personal preferences. Researchers and writers may use a combination of these tools to meet their specific requirements throughout the research and writing processes.
15.	Survey and Questionnaire Tools (e.g., Google Forms, SurveyMonkey, Microsoft Forms, SurveyGizmo, etc.)	Survey and questionnaire tools are essential for creating, distributing, and analyzing surveys and questionnaires for research, quizzes, feedback collection, and data-gathering. Survey and questionnaire tools cater to various needs, ranging from simple feedback collection to more complex research and analysis. The choice of a tool often depends on factors such as the level of customization required, collaboration needs, data analysis capabilities, and whether users prefer a free or subscription-based service. Researchers and organizations may use these tools to gather valuable insights from respondents and make data-driven decisions.

4.2 Use of Research Utility Tools in Research Communication: Prospects and Challenges

In the current digital age, researchers can access various utility tools that enhance their ability to communicate findings, collaborate with peers, and disseminate knowledge. These tools are crucial in streamlining research communication but come with challenges and prospects. This overview explores the landscape, opportunities, and challenges of research tools.

4.2.1 Prospects

- Artificial Intelligence (AI)-driven features, such as automated data analysis and predictive analytics, have the potential to make research utility tools even more powerful and user-friendly.
- As utility tools evolve, they can facilitate interdisciplinary and multidisciplinary collaboration, fostering innovation and research breakthroughs.
- The open science/open data movement may lead to the development of more open-access and transparent utility tools, reducing barriers to knowledge dissemination.
- Efforts to improve the accessibility of research utility tools can ensure that researchers from diverse backgrounds benefit from these tools (Donner, 2023).
- Future utility tools may allow researchers to customize their workspaces and workflows to meet their needs and preferences.

4.2.2 Challenges

- Researchers must be cautious about their data's Ethical Concerns, Privacy and Security Concerns when using online tools, especially when sharing sensitive or unpublished information.
- Not all researchers are technologically proficient, which can lead to a digital divide in academia, i.e., technical barriers. Training and support are necessary to ensure that all researchers benefit from utility tools.
- Although reference management tools are valuable, they can also be complex to set up and maintain, leading to potential data loss or citation errors, resulting in data management complexity (Ali, Gupta, Nayak & Lenka, 2016).
- The sheer volume of information available through research utility tools can be overwhelming, making it challenging to identify relevant resources and effectively collaborate.
- Some utility tools require subscriptions or premium features, which can be costly for researchers, especially those from resource-limited institutions.

CONCLUSIONS

Research utility tools in research communication have become indispensable for researchers, academics, and professionals across diverse fields. These tools catalyze streamlining the research process, ensure scholarly work's accuracy and efficiency, and foster collaboration, data management, and knowledge sharing. In conclusion, this study underscored enhanced efficiency, improved collaboration, data-driven insights, quality assurance, and accessible research key points in research communication. The prospects for these tools include AI integration, interdisciplinary collaboration, and improved accessibility, which promise a brighter future for research communication in the digital age. Researchers should embrace these tools while remaining vigilant about associated

challenges. As the research landscape continues to evolve, adopting these research utility tools is likely to expand, and new tools may emerge to address emerging needs and challenges. Researchers and institutions that embrace these tools benefit from enhanced productivity, greater collaboration, and dissemination of high-quality research contributions to the broader scientific and academic community. In the ever-evolving world of research communication, these utility tools are invaluable assets, paving the way for innovation and progress in pursuing knowledge and discovery. However, they pose ethical concerns, privacy-related challenges, technical barriers, and information overloads.

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