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Navigating Scholarly Literature with ResearchRabbit: A Comprehensive Analysis

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ABSTRACT

This paper explores the functionality and effectiveness of ResearchRabbit, focusing on personalised citation-based recommendations, interactive visualisations, collaboration tools, and integration with reference management software. Through a detailed analysis, this study evaluates how ResearchRabbit streamlines the literature review process, enhancing the efficiency and quality of research. The paper highlights its unique advantages and potential limitations by comparing ResearchRabbit to traditional literature search methods and other contemporary tools. The findings suggest that ResearchRabbit significantly reduces the time and effort required for literature reviews, enabling researchers to uncover relevant publications that might be overlooked through conventional methods. The personalised and interactive approach of ResearchRabbit not only aids in discovering pertinent literature but also fosters collaborative research efforts. This paper concludes with recommendations for researchers and potential directions for future development of literature mapping tools, emphasising the transformative impact of ResearchRabbit on academic research workflows.

Keywords: ResearchRabbit, Literature Mapping, Review Literature, Literature Citation Tools

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1. Introduction

ResearchRabbit is a powerful, free online tool that revolutionises the literature review process for researchers.

Designed to be the "Spotify for Papers", it allows users to seamlessly navigate the vast landscape of scholarly literature by leveraging citation-based mapping. This personalised, citation-based approach saves researchers valuable time and helps them make informed decisions about the direction of their literature review. Users can start with one or more "seed papers," the tool will automatically recommend related publications, cluster them based on their relationships, and provide interactive visualisations to guide the exploration [1] ResearchRabbit offers personalised digests, collaboration tools, and integration with reference management software, further enhancing the research workflow. This innovative tool can transform how researchers engage with scholarly literature by leveraging the power of citation networks and machine learning. ResearchRabbit is created to enable the process of unstructured searching and to leave a left-to-right trace from the initial publication(s) through any chosen authors or publications. ResearchRabbit is meant for any researcher who performs an unstructured publication search.

The number of scholarly documents on the public web is estimated to be around 114 million [2] (Khabsa & Giles, 2014), making it increasingly challenging for researchers to stay up-to-date with the latest developments in their field. Traditional literature search methods often lead researchers down a "rabbit hole" of endless citation mining, which can be time-consuming and inefficient [3] (Haddaway & Bayliss, 2015). ResearchRabbit streamlines this process by providing a personalised, citation-based approach that helps researchers navigate the vast amount of available literature. Moreover, ResearchRabbit's features, such as personalized digests and collaboration tools, can help researchers stay organised and efficient in their literature review process. The tool's integration with reference management software further enhances the research workflow, allowing researchers to seamlessly incorporate their findings into their work [4] (Shema et al., 2014). By leveraging the power of citation networks and machine learning, ResearchRabbit has the potential to transform the way researchers engage with scholarly literature, making the literature review process more efficient and effective. ResearchRabbit uses statistics and data to deliver deep insights into trends, relationships, and advances in scientific literature. [5,6] (Syopiansyah 2017) (Elvi Fetrina 2024)

2. Overview of Literature Mapping Tools

Literature mapping is a powerful technique for discovering relevant scholarly articles by exploring connections between publications. It involves visualising the relationships between papers based on factors such as citations, authors, keywords, and metadata [7] (Princeton University Library, 2023). In recent years, several innovative literature mapping tools have emerged, making it easier for researchers to navigate the vast landscape of scientific literature.

One of the most popular literature mapping tools is Connected Papers, which uses a single "seed paper" to quickly identify similar publications and detect seminal works and review articles [8] (Enago Academy, 2021). The tool creates a graph based on a proprietary similarity metric, allowing researchers to export the identified papers to various reference managers. Another helpful tool is Inciteful, which can be used with multiple starter articles in an iterative process (Enago Academy, 2021). It produces lists of similar papers, essential papers in the graph, recent papers by top authors, and the most important recent papers. Inciteful also allows for filtering results by keywords and importing seed papers directly by title or DOI. Litmaps follows an iterative process similar to Inciteful and creates visualisations for the found papers (Enago Academy, 2021). It supports importing papers using BibTex format and allows setting up email updates for emergent literature. Litmaps' unique feature is the ability to overlay different maps to look for overlaps of papers.

Citation-based sites like Citation Gecko and Local Citation Network are open-source tools that make it easier to discover relevant literature than keyword-based search engines [9] (Clemens, 2020). These tools allow users to upload "seed papers" and extract references to create visual citation networks, enabling the discovery of new papers relevant to the literature search. Microsoft Academic and Lens.org are other notable literature mapping tools that leverage citation data to recommend related publications [10] (Tay, 2021). These tools can be handy for identifying influential papers and authors in a specific research field. In addition to these citation-based tools, there are also citation context tools that analyse the context in which citations appear in the citing paper (Enago Academy, 2021). These tools can provide valuable insights into the relevance and importance of a citation within the citing paper. Overall, literature mapping tools have revolutionised the way researchers conduct literature reviews, making it easier to discover relevant publications, identify research gaps, and explore potential areas for original study (Clemens, 2020). By leveraging citation networks and metadata, these tools can save researchers significant time and effort navigating the vast amount of scholarly literature available. Thus, AI and Machine Learning impact literature searching and enable the mapping of the related literature.

Literature mapping software has an important part to play in the process of systematic literature reviews (SLRs) and refining the research process. Yee (2003) [11] created a dynamic literature map to represent interlinkages among significant concepts of typography and new media, supporting researchers in moving through intricate information. Marshall and Brereton [12] (2013) carried out a mapping study that recognized tools used to automate the SLR process in software engineering and showed that more such tools needed to be developed and assessed. Fabbri et al. [13] (2018) proposed the StArt tool, which utilizes visualization and text mining to support systematic reviews and mappings with better research area mapping quality. Dotan and Florentin [14](2016) highlighted the significance of literature review tools during the initial research stages, stating that although technology has enhanced these tools, there is still a limitation. Overall, these studies highlight the changing landscape of literature mapping tools and their role in research strategies.

3. An Overview of ResearchRabbit

ResearchRabbit is a free, innovative "citation-based literature mapping tool" that aims to revolutionise how researchers conduct literature reviews and discover relevant scholarly publications. Designed to be the "Spotify for Papers", ResearchRabbit leverages citation networks and machine learning algorithms to help researchers efficiently navigate the vast landscape of academic literature. The core premise of ResearchRabbit is to allow users to start with one or more "seed papers" and then automatically generate recommendations for similar, earlier, and later works. This citation-based approach helps researchers uncover relevant publications they may have missed through traditional keyword-based searches or manual citation mining.

One of the key features of ResearchRabbit is its interactive visualisation capabilities. The tool generates visual maps that depict the relationships between publications, authors, and citation networks. These visualisations serve as "jumping off points" for researchers to explore the literature more intuitively and serendipitously, potentially leading to the discovery of essential works they may not have considered. In addition to the core citation-based recommendations and visualisations, ResearchRabbit offers several other features to enhance the research workflow:

- **Personalized Digests:** The tool provides users with regular updates on the latest publications related to their research collections, helping them stay informed without being overwhelmed by irrelevant information.

• **Collaboration Tools:** ResearchRabbit allows researchers to share their collections and collaborate with others, facilitating the exchange of ideas and the collective exploration of the literature.

• **Integration with Reference Management:** The tool can seamlessly integrate with popular reference management software, such as Zotero, streamlining organizing and citing references.

• **Language Assistance:** For non-native English speakers or those struggling with language barriers, ResearchRabbit offers features to help refine grammar, improve sentence structure, and enhance the quality of written research outputs.

The network view lets users see connected publications [15] (Cole V 2023). In short, ResearchRabbit represents a significant breakthrough in mapping and discovery, giving researchers a powerful and custom-made tool for navigating the vast expanse of academic literature. As this tool evolves and expands, it radically changes how researchers engage with and discover relevant publications and ultimately enhances the quality and efficiency of their work.

4. Problem Statement

This work examines the framework of "problem statement literature mapping" from various perspectives. We aim to show the effectiveness of literature mapping methods in finding research gaps, summarizing already established knowledge, and giving detailed descriptions of intricate matters in their respective fields. We specifically use the ResearchRabbit as the testbed.

How does ResearchRabbit effectively perform the literature streamline function in the literature review process? We will examine the ResearchRabbit's Personalized Recommendation process, which ultimately helps in assessment. Finally, we document the ResearchRabbit's limitations and features.

5. Methodology

This study reviews the ResearchRabbit literature mapping tool, a free online platform that uses citation-based analysis to help researchers discover relevant scholarly publications. This review aims to provide an in-depth evaluation of ResearchRabbit's features, functionality, and utility for conducting literature reviews. To assess ResearchRabbit, the researchers created an account on the ResearchRabbit platform. They thoroughly explored its various features, including Adding seed publications to create a collection, generating recommendations for similar, earlier, and later works, Visualizing citation networks and author collaborations, setting up personalised publication alerts sharing collections and collaborating with other users.

The researchers assessed the overall usability of the Research Rabbit platform, considering factors such as navigability and ease of use, clarity of information presentation, accessibility for users with disabilities, and integration with common research workflows. The data collected through the above methods was analysed to identify the key strengths, weaknesses, and overall value proposition of the Research Rabbit platform. The analysis evaluated the effectiveness of Research Rabbit's core features, such as citation-based recommendations, visualisation tools, and collaboration capabilities, assessing the platform's user-friendliness, accessibility, and integration with common research workflows.

6. Limitations

The researchers acknowledge the following limitations of this study:

• The findings are primarily based on the information and data provided by the ResearchRabbit vendor, which may be subject to potential biases or incomplete information.

• The study is based on a relatively short-term evaluation of the ResearchRabbit platform and does not include longitudinal data on user experiences and outcomes over an extended period.

• Researchers' experiences and perceptions of the ResearchRabbit platform may not fully represent the diverse user base and their unique needs and preferences.

7. Steps Involved in the Workflow

Step 1: Create an Account: Users first need to create a free account on the ResearchRabbit platform to access its features.

Step 2: Add Seed Publications: Users add one or more "seed publications" to their ResearchRabbit collection. These can be added by uploading a RIS or BibTeX file, or by using ResearchRabbit's search functionality powered by Pub Med or Semantic Scholar (Figure 1).

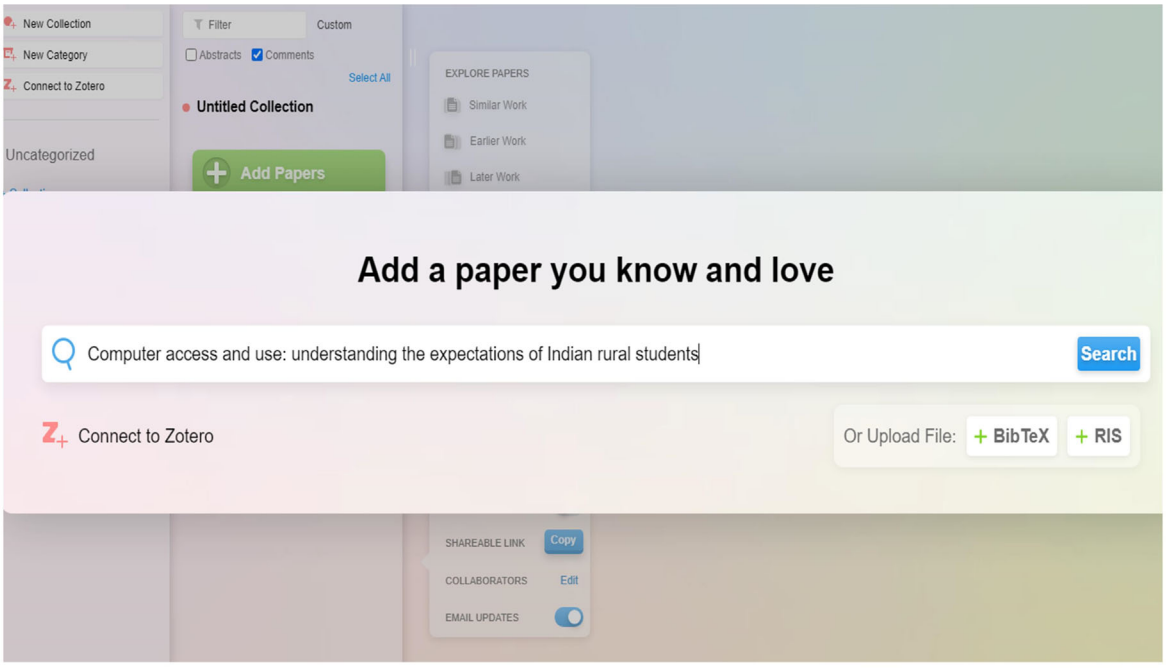

Figure 1. Publication search box window/uploading window

Step 3: Explore Recommendations: Once publications are added to a collection, ResearchRabbit's algorithm generates recommendations for similar works, earlier works, and later works. These recommendations are presented to the user through interactive visualisation maps and lists.

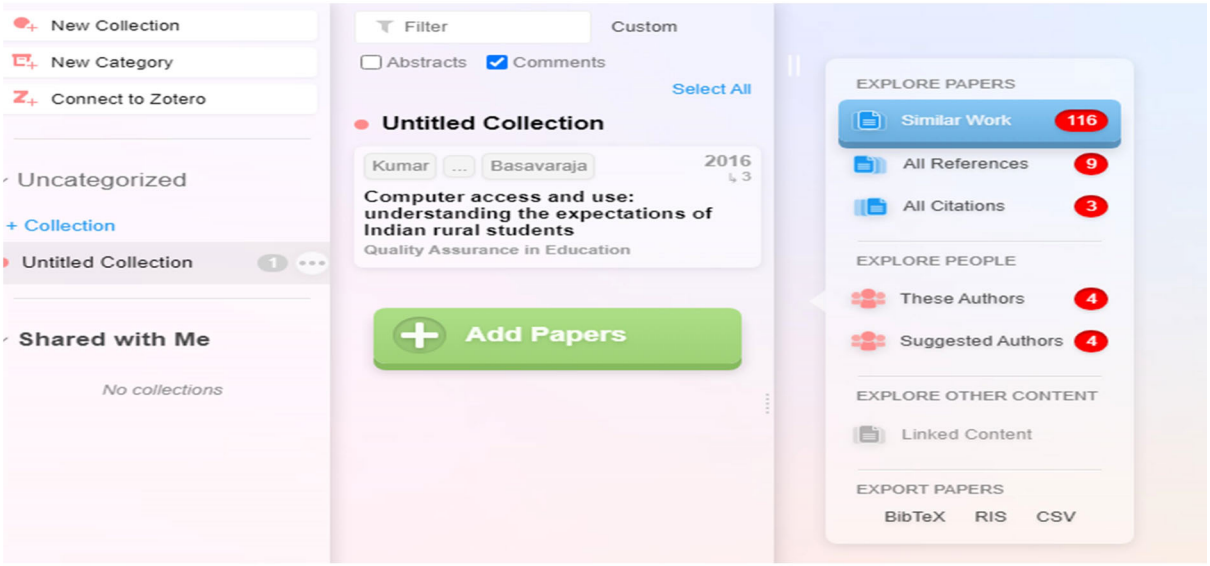

Figure 2. Exploration window of papers

Step 4: Discover Related Authors: In addition to publication recommendations, ResearchRabbit also provides information on related authors, including their other published works and collaboration networks.

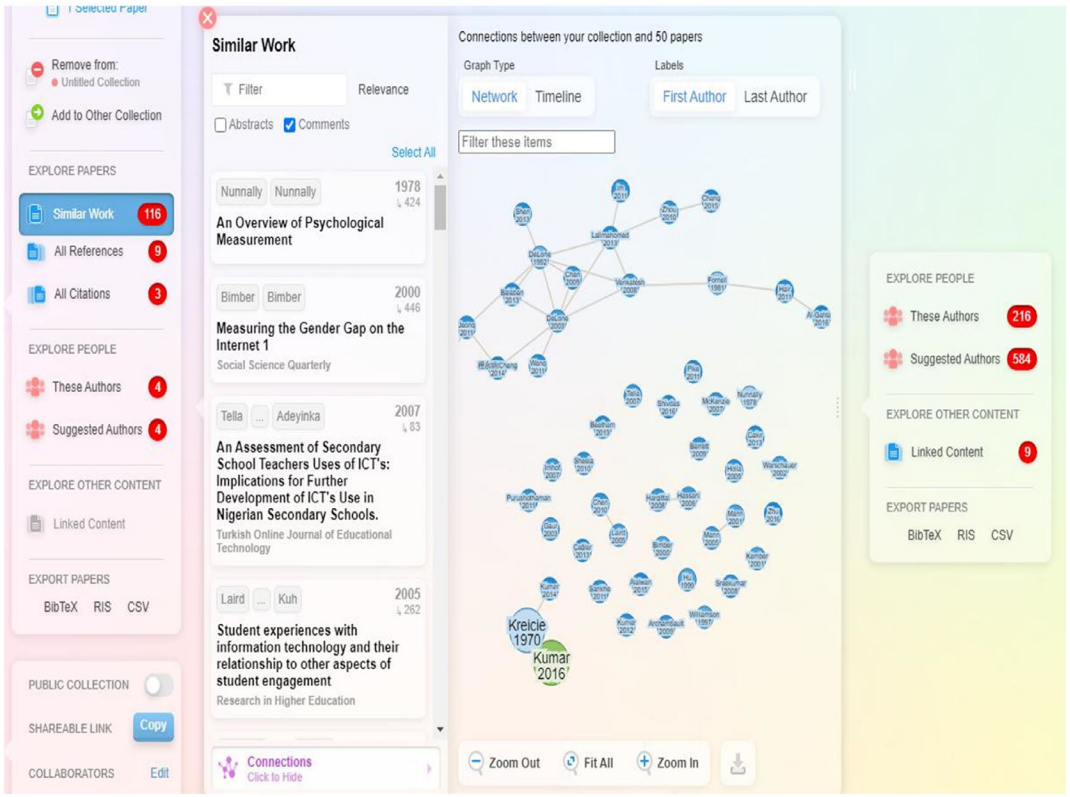

Figure 3. Network visualisation of similar research papers

Step 5: Refine Collections: As users continue to add publications to their collections, ResearchRabbit's recommendations become more personalised and tailored to the user's research interests.

Step 6: Collaborate and Share: ResearchRabbit allows users to share their collections with colleagues, enabling collaborative exploration and discovery of relevant literature.

Step 7: Export and Integrate: Users can export their ResearchRabbit collections into citation management tools like Zoteroto incorporate the discovered publications into their research workflows seamlessly.

The key aspects of the ResearchRabbit workflow are the ability to start with a few seed publications and then leverage the tool's citation-based mapping and recommendation capabilities to uncover a broader network of relevant literature. This iterative process of building and refining collections helps researchers efficiently navigate the vast landscape of scholarly publications.

8. ResearchRabbit Features

These tools can help in scientometric analysis for individual researchers, institutions and organizations. [16] (Srivastav, S)

- **Time-Saving:** ResearchRabbit helps researchers save significant time in discovering relevant publications by leveraging citation-based recommendations and interactive visualisations.

- **Personalized Recommendations:** The tool learns from users' preferences and provides personalised suggestions for similar, earlier, and later works based on their collections.

- **Intuitive Exploration:** ResearchRabbit offers an easy-to-use interface that allows users to navigate the literature intuitively, using the interactive visualisations as "jumping off points".

- **Collaboration and Sharing:** The platform enables researchers to collaborate and share their collections with colleagues, facilitating the exchange of ideas and collective exploration of the literature.

- **Zotero Integration:** ResearchRabbit seamlessly integrates with popular reference management software like Zotero, streamlining the process of organising and citing references.

9. An evaluation of the Issues of ResearchRabbit

- **Initial Learning Curve:** ResearchRabbit's extensive range of features can be overwhelming at first, requiring users to invest significant time in learning how to use the tool to its full potential.

- **Limited Exploration Paths:** ResearchRabbit currently limits exploration to a single linear path, leaving users to remember which branching paths of authors and citations they have already explored.

- **Lack of Author Disambiguation:** The author visualisation maps in ResearchRabbit sometimes struggle with author disambiguation, with a single author occasionally appearing as two separate nodes in the collaboration network.

• **Reliance on a limited set of databases:** While ResearchRabbit claims to have an extensive database of publications, it primarily relies on Pub Med for medical sciences and Semantic Scholar for other subject areas, potentially missing relevant sources from the other databases.

• **Potential for information overload:** The ability to generate many recommendations on a few "seed papers" may lead to information overload, especially for users unfamiliar with the research topic.

10. Conclusion

ResearchRabbit has emerged as a transformative tool in academic research, offering significant advancements in how researchers conduct literature reviews. By leveraging citation networks and machine learning, ResearchRabbit provides a personalised and efficient approach to discovering relevant scholarly publications. The tool's interactive visualisations, personalized digests, and collaboration features enhance the research workflow, making it easier for researchers to navigate the vast academic literature. The evaluation of ResearchRabbit demonstrates its effectiveness in streamlining the literature review process, saving researchers significant time and effort. The personalised recommendations and intuitive exploration capabilities enable researchers to uncover pertinent literature that might be overlooked through traditional methods. Additionally, the integration of reference management software and collaboration tools enhances its utility, fostering a more organised and collaborative research environment.

However, the study also highlights some limitations, including the initial learning curve, potential information overload, and reliance on a limited set of databases. Addressing these challenges will be crucial for the continuous improvement and adoption of ResearchRabbit in the research community. Overall, ResearchRabbit represents a significant advancement in literature mapping to revolutionise how researchers engage with scholarly literature. As the tool continues to evolve, incorporating user feedback and expanding its capabilities, it is poised to play an increasingly important role in enhancing the efficiency and quality of academic research.

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