

**Bibliographic Reference management: The Role of Technological Appropriation in Students**

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ABSTRACT

Purpose Over the past two decades, bibliographic reference management software has evolved as an example of technical innovation. Students believe reference management software, such as Mendeley, Zotero, Endnote, and Refworks, to be a modern tool and a tremendous help when conducting academic research. Consequently, this study aims to emphasize the significance of bibliographic reference management software. **Design/methodology/approach** This research was conducted using Bibliometric analysis. For this aim, relevant papers were selected for review, and after screening, 18 papers were finalized. In different years of reviewed published research papers, authors apparently employed varying research procedures.

Findings The results suggested that reference management software improves the trustworthiness of student academic research. The perceptions of various pupils vary based on the reference management software they use. Software for managing references promotes writing and critical thinking in academic research. **Practical implications** The research has significant practical significance as a valuable supplement to the trend of student adoption of reference management software for academic research. The software developers can also get information from this study by evaluating the significance of bibliographic management software, the extent of its quick emergence, and the increasing tendency of students to adopt it for their theses and other research projects. **Originality/value** The unique contribution of this study to the corpus of knowledge gives it theoretical relevance. As it is an important addition to the literature regarding the selection of student reference management software in academic institutions, it is included here.

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1. Introduction

Rapid technological advancement affects every element of human life. The industrial, academic, and other sectors are implementing fresh approaches of technology appropriation in an effort to achieve the intended good outcomes. Similarly, the academic sector is gaining valuable insights into the prevalent worldwide technological incentives. The bibliographic reference managers, regarded as a viable tool of reference management software, are well-known software for authors and researchers to record bibliographic citations and manage project references, whether they are students or professionals (Nitsos, Malliari, & Chamouroudi, 2022; Zhang, 2012). Reference management software enables users to save references in digital format, thereby simplifying their job. The development of student enthusiasm in research is allegedly reliant on the utilization of this program. According to Gilmour and Cobus-Kuo (2011), Refs management software programs vary based on the needs of the user and include RefWorks, Connotea, Endnote, Papers, and Sente. Some bibliographic management systems are free, while others need a subscription fee (Hensley, 2011; Saxena & Kaushik, 2022). Students like this ubiquitous incentive of modern technology where bibliographic reference management facilitates the discovery of related books, allowing them to store paper and bibliographic metadata in their databases for subsequent retrieval. Thus, students can be permitted to enter references and citations in the chosen styles when creating a work. The software of a bibliographic reference manager assists in keeping track of readings and references and makes it possible to examine referencing information in order to cite relevant content in work. This technical innovation has improved the precision and consistency of research through the use of reference management software. In the past, references were printed on index cards and preserved in boxes (Francese, 2013; Ram, 2014). With rapid technical advancement, however, reference management software enables the digitization of scholars' personal collections of linked materials. The project seeks to 1) review previous studies on bibliographic reference management and student technological adoption. 2) The distinct perspective of these new technological incentives following academic benefits might be evaluated in cases when students opt to employ a bibliographic reference manager when discussing the prior literature. 3) To examine bibliometric reference management and technological adoption among students using bibliometric analysis of linked publications (Almeida & Souza, 2021).

The development of reference management software is a response to growing student demand. Nonetheless, this reference management software has made life easier for students and academics. According to reports, businesses also teach software utilization in their processes. The academic industry has achieved a significant share of bibliographic reference management, so a work can be cited with a single click (Francese, 2011; Zhang, 2012). The technological innovation has made life easier for people, as the tedious and time-consuming annual citation of references was previously a burden. Many researchers find reference management to be time-consuming and tiresome, whereas students perceive it to be time-consuming and boring (Prema & Periasamy, 2022). Nevertheless, some consider that bibliographic reference management software aids in enhancing the lucidity and practicability of students undertaking specific study. Consequently, there is a changing perspective, i.e. positive and negative, following the use of reference management software and technology. Previous study elaborates on the many types of software and tools, citation

methodologies, and the benefits of employing each approach and instrument (Kleminski, Kazienko, & Kajdanowicz, 2022). Regarding technological appropriation, the viewpoints of students reveal an absence of sufficient investigation. This program is typically utilized by students when using the published works of other authors, which lends legitimacy to their research. This study tries to fill the void by examining previous research, assessing the data taken from those studies, and developing conclusions based on the topic at hand (McCullough, Patrick, & Boni, 2022).

Thus, bibliographic reference management aids students in carrying out the three fundamental research activities of searching, saving, and writing. This software assists students in locating relevant historical studies and allows them to keep studies/papers together with their bibliographic metadata in their database for later retrieval. Thus, the software helps students to incorporate references and citations in the chosen style when creating a papers. Because scientific knowledge and procedures provide the primary input source for students' technological practice development, it is unavoidable that research has accelerated in terms of its feasibility and convenience (Bal, Benders, & Vermeerbergen, 2022; Mendes, Silveira, & Galvão, 2019). Citing an author's or publisher's work is a fundamental requirement for academic honesty and a moral commitment for any research conducted for pupils. However, the instructions and references led to incredibly time-consuming and exhausting practice. EndNote, Mendeley, Readcube papers, Zotero, and the AGE (Article galaxy enterprise) are just a few of the reference management applications that have been developed and are currently in use (Basri & Patak, 2015). Students utilize this software, which is regarded as a boon due to the time and money it saves despite the manual referencing process. It has been suggested that technological appropriation by students has good effects since it facilitates the adoption and adaptation of technology by students and their incorporation of it into academic research or other tasks, so making the work quite convenient (Yela et al., 2022). Although technology has both beneficial and negative effects on students, bibliographic reference management software plays a crucial role in the field of study. Therefore, it is essential to examine ways to increase their understanding of technological appropriation. This research intends to review previous studies for this goal, and bibliometric analysis will be used to present the topic's final findings (Dattolo & Corbatta, 2022).

The research has both theoretical and practical value, since developers of reference management software can get useful insights to expedite the novel development of reference management software for students. There is a dearth of research that examines bibliographic reference management and students' perspectives on technological appropriation, therefore the research also has theoretical importance. The authors can also determine the value of employing their published sources through this research, as the trend of quoting and referring has expanded dramatically. Utilizing reference management software to conduct research generates a significant lot of student interest, hence enhancing the contribution of theoretical literature and enhancing the understanding of academics. Increased interest in bibliographic management software on the part of students boosts their contribution to research. Prior study has mostly analyzed the reference management software individually in order to determine its influence and its nature, etc. The novelty of this work consists in the research methodology

employed, including bibliometric analysis and the association of bibliographic management software with technological appropriation among college students.

2. Research Methodology

This study's primary objective is to investigate students' perceptions on the use of bibliographic reference managers and technological appropriation (Barjaba, 2021). To attain this objective, the best journal articles and papers were identified. For this review approach, the relevant publications and papers were retrieved and carefully screened. In this regard, bibliometric analysis was deemed the most appropriate methodology. This technique is deemed effective for summarizing larger quantities of bibliometric data in order to identify developing patterns and intellectual structure within the context of the connected research field or subject (Donthu et al., 2021). The present research was broader in scope, with an emphasis on the application of bibliometric analysis.

In business and education research, bibliometric analysis is gaining great popularity. It involves the application of quantitative tools to bibliometric data. In bibliometrics, several statistical tools are used to examine articles, books, and other publications, particularly in the scientific context (Moral-Muñoz et al., 2020). These techniques are more prevalent in the fields of information science and library science. Based on Bahuguna, Srivastava, and Tiwari (2022) and Shen and Ho (2020), the present study employed bibliometric analysis as well. From 2002 to 2021, about 18 conference papers and journal articles were retrieved from the selected online databases. According to Hincapie et al. (2021), bibliometric analysis is a scientific and sophisticated research tool that may be utilized to gain a full understanding of any study field. Therefore, for the present study, we conducted an effective bibliometric evaluation of students' perceptions on the use of bibliographic reference managers and technological appropriation. A VOSviewer and bibliometric software were applied for this purpose. This research technique includes four fundamental processes, including (1) data collecting, (2) data analysis, (3) data visualization, and (4) data interpretation, as shown in Figure 1.

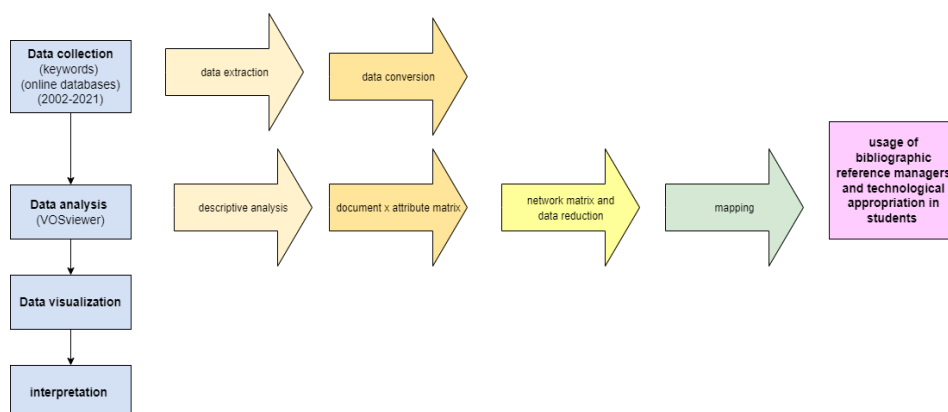


Figure 1. Research Methodology

2.1 Search Criteria

An effective and relevant search criterion is essential for research studies. The search parameters are developed based on the subject's core themes and notions. Consequently, a list of important keywords for database research in the context of the present study was formulated after a thorough evaluation of previous research studies, such as [Hincapie et al. \(2021\)](#) and [Shen and Ho \(2020\)](#), concerning the perception of the use of bibliographic reference managers and technological appropriation in students. This list contained the terms "Bibliographic Reference Managers;" "Technological Adaptation," "Students' Perceptions," "Information Communication Technology (ICT)," "Education," "Information Technology," and "Web."

2.2 Database Selection

The size of the dataset for the present study supported the use of bibliometric analysis to achieve the study's stated objective. Scopus and Wos are the two key databases utilized for research evaluation and large-scale bibliometrics operations ([Herrera-Franco et al., 2020](#)). For the purpose of gathering the necessary bibliometric data about students' knowledge of bibliographic reference management and technological appropriation, diverse online databases were selected for the present study, drawing inspiration from a variety of earlier research. Science Direct, IEEE, Wiley Online, Mdpi, Francis and Taylor, Emerald, Springer, and Scopus were therefore chosen as the online databases for this investigation.

2.3 Data Collection Procedure

Important measures were taken to obtain the necessary bibliometric data for this research investigation. Appropriate inclusion and exclusion criteria have been created for this purpose, as described below:

2.4 Inclusion and Exclusion Criteria

The articles and journals from the identified online databases were collected for this study; no additional online databases were considered for data collection. All of the selected papers and journal articles were written in English, and no other languages were considered for this study. The era examined for the selection of connected papers and journal articles was an additional key aspect. Consequently, from 2002 to 2021, the papers and journal articles associated with the list of keywords developed for the present study were collected.

After entering the chosen keywords, 67 documents from the chosen databases were retrieved. Review papers, conference papers, journal articles, research papers, and book chapters were among these works. These documents were reduced to journal articles and conference papers, and a total of 35 journal articles and conference papers were chosen. After transferring the acquired bibliometric data to an Excel spreadsheet, an appropriate analysis was conducted. The research papers and publications that were not written in English and lacked the chosen keywords were eliminated from the list. Any conference

papers or journal articles published prior to 2002 were also eliminated, leaving a final list of 18 conference papers and journal articles for further study.

2.5 Data Analysis

The study field's improvements have produced suitable and efficient mapping tools for bibliometric analysis, such as the "Bibliometrix package of R software" and "VOSviewer." According to Moral-Muñoz et al. (2020), VOSviewer is an efficient network analysis tool with remarkable text-mining skills for working with massive networks. VOSviewer is utilized in today's research world for a variety of industries, including construction, education, and technology, among others (Shah et al., 2019). This explains the potential of VOSviewer to map a suitable theoretical framework in the current study focusing on students' perceptions of the use of bibliographic reference managers and technological appropriation. Authors, citations, nations, keywords, and scientific journals were examined as five of the most important features of the collected articles and papers. Thus, VOSviewer was used to assess the bibliometric data acquired in the context of this research investigation.

3. Results

3.1 Sources

To evaluate the qualities of the studies included in the research for bibliometric analysis, a descriptive analysis was conducted. The time frame, total documents, number of keywords, and authors included in the analysis are detailed in Table 1. According to the methodology section, eighteen studies published between 2002 and 2021 were included in the bibliometric analysis. Thus, the research articles span a period of 19 years. In addition, there were around 53 authors included in the research, based on abstract analysis, and over fifty keywords. This section provides an overview of the studies included in the bibliometric analysis, with further information provided below.

Table 1

Main information about the data

Main information about the data	
Time horizon	2002-2021
Total documents	18
Keywords and ID	50
Authors	53

The studies' titles and references are included in Table 2. The purpose of the study was to evaluate students' technological proficiency in relation to their use of reference management software. The researchers conducted a review of studies published over the past two decades and determined that 18 studies met the inclusion criteria established by the researcher. The initial search yielded more than thirty-five articles. However, after reviewing the abstracts, titles, and major results sections, the researcher reduced the

number of papers to 18, as the remaining 17 did not adequately reflect the aims of the study. Therefore, the Titles and Bibliographies of the study are presented in Table 2 in increasing publication year order.

Table 2

Titles of included studies

Title	Reference
Finding the ties that bind: Tools in support of a knowledge-building community	(Hoadley & Pea, 2002)
Potential of information technology in dental education	(Mattheos et al., 2008)
From tailored databases to Wikis: using emerging technologies to work together more efficiently	(Regolini et al., 2008)
Finding and managing information: generic information literacy and management skills for postgraduate researchers	(Heading et al., 2010)
Support mechanisms for early, medium, and longer-term use of technologies	(Mendoza, Stern, & Carroll, 2010)
Bibliographic management software: A focus group study of the preferences and practices of undergraduate students	(Salem & Fehrmann, 2013)
Exploring Indonesian students' perception on Mendeley Reference Management Software in academic writing	(Basri & Patak, 2015)
Examining the reference management practices of humanities and social science postgraduate students and academics	(Melles & Unsworth, 2015)
Multilingual scholarship: non-English sources and reference management software	(Lisbon, 2018)
Use and awareness of reference management software among community college students	(Pathak & Johnson, 2018)
Types of ICT applications used and the skills' level of nursing students in higher education: A cross-sectional survey	(Harerimana & Mtshali, 2019b)
Nursing students' perceptions and expectations regarding the use of technology in nursing education	(Harerimana & Mtshali, 2019a)
Is the Use of Reference Managers Driven by Necessity or Policy Pressure?	(Nurkhin et al., 2019)
EFL Students Perception on Mendeley Reference Manager in Thesis Writing	(Ariyanti & Fitriana, 2020)
Acceptance and usage of bibliographic management software in higher education: the student and teacher point of view	(Setiani et al., 2020)
What Makes a Good Reference Manager? A Quantitative Analysis of Bibliography Management Applications	(Cai et al., 2021)
Researcher's Perception on Zotero and Mendeley Reference Management Tools: A Study	(Rangaswamy & Babu, 2021)
Undergraduate Students' Perception Towards the Use of Mendeley Referencing System on Students' Thesis Writing	(Santosa, Adnyani, & Amarwati, 2021)

This study's dataset was large enough to support the use of bibliometric analysis to accomplish the suggested objective. On the basis of earlier research, various online databases were chosen for this study on student knowledge of bibliographic reference management and technological appropriation. Selected databases include Science Direct, IEEE, Wiley Online, Mdpi, Francis and Taylor, Emerald, Springer, and Scopus. However, none of the 18 studies overlapped journals, and they all belonged to different publications. The following table provides a summary of the Journals where the articles were published. The 18 journals listed in Table 3 indicate that no two papers were published in the same journal.

Table 3

Descriptive Summary of Journals

Journal	Count of journal
Proceedings of the 1st International Conference on Business, Law, and Pedagogy, ICBLP 2019, 13-15 February 2019, Sidoarjo, Indonesia	1
Journal of Education Research and Evaluation	1
International Journal for Researcher Development	1
2020 IEEE Conference on e-Learning, e-Management, and e-Services (IC3e)	1
Journal of Physics: Conference Series	1
21st Australasian Conference on Information Systems	1
The Journal of Academic Librarianship	1
Africa Journal of Nursing and Midwifery	1
International Journal of Africa Nursing Sciences	1
Asian CHI Symposium 2021	1
Journal of New Librarianship	1
Australian Academic & Research Libraries	1
Library Philosophy and Practice	1
Building virtual communities: Learning and change in cyberspace	1
Public services quarterly	1
European Journal of Dental Education	1
2015 2nd international conference on information technology, computer, and electrical engineering (ICITACEE)	1
Interdisciplinary Journal of Information, Knowledge, and Management	1
Grand Total	18

The greatest number of research were published in 2019 and 2021, as shown in Table 4, which provides a distribution of studies based on their publication year. To collect the necessary data for this investigation, articles and papers were culled from several web databases. As English was the only language considered for this study, all papers and journal articles had to be written in English. In addition, the timeline for selection was essential because the papers and journal articles had to be related with the study's keyword list. Therefore, the gathered papers and journal articles for this study span the years 2002 to 2021.

Table 4

Year-wise distribution

Year	Count of year	Percentage
2002	1	6%
2008	2	11%
2010	2	11%
2013	1	6%
2015	2	11%
2018	2	11%
2019	3	17%
2020	2	11%
2021	3	17%
Grand Total	18	100%

Figure 2 depicts the publication year distribution of studies, while Table 4 reveals that just 6% of studies were published between 2002 and 2013. Similarly, 11 percent of works were published in 2008, 2010, 2012, 2018, and 2020. In addition, 17 percent of studies were published in 2019 or 2021. These figures demonstrate that, during the past two decades, Researchers have prioritized the use of reference management software and technological adaptation. In addition, the attention on reference management software as a tool for academics and students has expanded over the past seven years, as indicated by the publications published between 2015 and 2021.

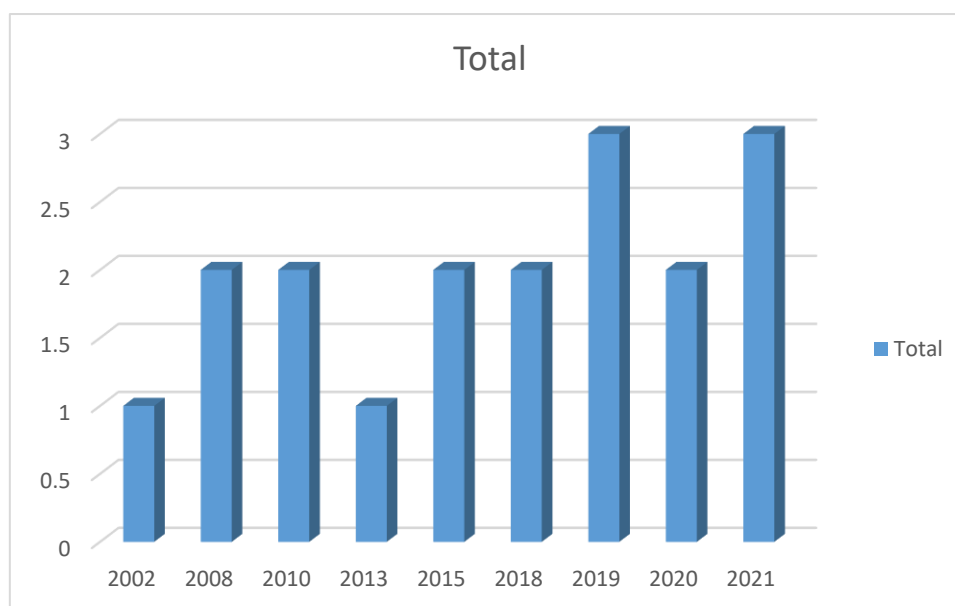


Figure 1: Frequency of studies published yearly

Table 5 illustrates the distribution of journals by publication year; this table was created to examine the theme and publications where research were published each year. In 2021, the focus was on education, research, and library practice, while the two works released in 2020 were conference proceedings on business and legal pedagogy, e-learning, and management.

Table 5

Distribution by year and journal

Year	Journal	Count of journal
2021	Asian CHI Symposium 2021	1
	Journal of Education Research and Evaluation	1
	Library Philosophy and Practice	1
2021 Total		3
2020	2020 IEEE Conference on e-Learning, e-Management and e-Services (IC3e)	1
	Proceedings of the 1st International Conference on Business, Law And Pedagogy, ICBLP 2019, 13-15 February 2019, Sidoarjo, Indonesia	1
2020 Total		2
2019	Africa Journal of Nursing and Midwifery	1
	International Journal of Africa Nursing Sciences	1
	Journal of Physics: Conference Series	1
2019 Total		3
2018	Journal of New Librarianship	1
	The Journal of Academic Librarianship	1
2018 Total		2
2015	2015 2nd international conference on information technology, computer, and electrical engineering (ICITACEE)	1
	Australian Academic & Research Libraries	1
2015 Total		2
2013	Public services quarterly	1
2013 Total		1
2010	21st Australasian Conference on Information Systems	1
	International Journal for Researcher Development	1
2010 Total		2
2008	European Journal of Dental Education	1
	Interdisciplinary Journal of Information, Knowledge, and Management	1
2008 Total		2
2002	Building virtual communities: Learning and change in cyberspace	1
2002 Total		1
Grand Total		18

The 2019 findings were published in publications devoted to Nursing education, suggesting that reference management software has become a valuable tool within academia and is no longer isolated to the social sciences and language fields. Likewise, the scope and themes of journals published in 2018 were related to library sciences. The variety of journal articles and data themes imply that reference management and technology appropriation of students are now shared concerns among students and academics from various disciplines. This is demonstrated by the diverse fields covered by the included research, which include nursing and dentistry education, engineering sciences, library management, social sciences, pedagogy and education, e-learning, and virtual management.

3.2 Influential authors and keywords

After examining the source of the publications, the researcher evaluated the influence of the included studies' keywords and authors. The frequency of authors' names in the included papers is presented in Table 6, which reveals that two of the 18 studies were published by the same scholars.

Table 6

Frequency of names

Names	Count of names
A. Harerimana and N. G. Mtshali	11.11%
C. Hoadley and R. D. Pea	5.56%
A. H. Lisbon	5.56%
J. Salem and P. Fehrmann	5.56%
M. H. Santosa, L. D. S. Adnyani and L. R. Amarwati	5.56%
N. Setiani, B. R. Aditya, I. Wijayanto and A. Wijaya	5.56%
A. Ariyanti and R. Fitriana	5.56%
A. Melles and K. Unsworth	5.56%
Heading, Siminson, Purcell, and Pears	5.56%
A. Mendoza, L. Stern and J. Carroll	5.56%
M. Basri and A. A. Patak	5.56%
A. Nurkhin, A. Rustiana, H. Pramusinto and R. Setiyani	5.56%
N. Mattheos, N. Stefanovic, P. Apse, R. Attstrom, J. Buchanan, P. Brown,	5.56%
A. Camilleri, R. Care, E. Fabrikant and S. Gundersen	5.56%
A. Pathak and S. Johnson	5.56%
T. Cai, C. Chen, T.-H. Huang, and F. E. Ritter	5.56%
A. Regolini, F. Berger, E. Jannès-Ober, and L. Dorren	5.56%
B. Rangaswamy and R. Babu	5.56%
Grand Total	100.00%

Similar information is presented in Figure 2, which reveals that A. Harerimana and N. G. Mtshali were credited in 11.11 percent of the research. In comparison, the remaining authors were each referenced in 5.56 percent of studies, indicating that none of the other researcher names were repeated.

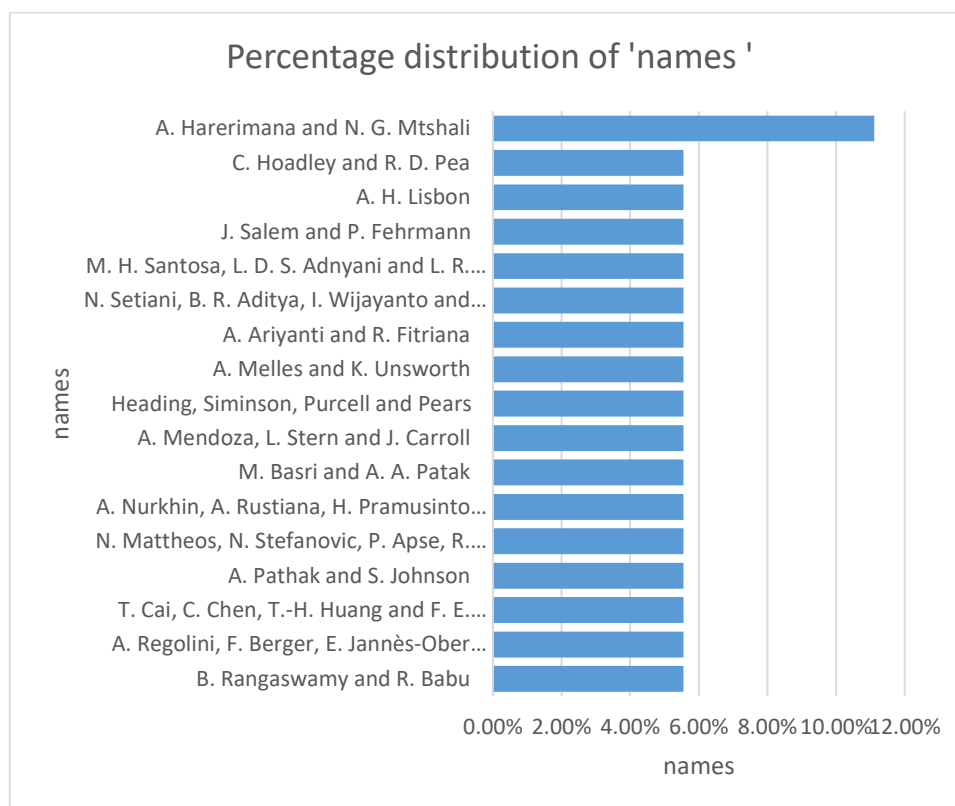


Figure 2: Percentage distribution of names

The researcher then mapped the keywords from the abstract and discovered that the student was referenced six times, reference management software was cited twice, Mendeley (an RFS) was mentioned three times, and the phrase citation was mentioned twice as well. This indicates that the majority of research evaluated the RFS's use among students, which was the study's objective. The results of the keyword analysis validate the researcher's application of accurate inclusion criteria.

Table 7

Frequency of keywords from abstracts

Keywords	Frequency
Reference management software	2
Mendeley	3
Reference management tools	2
Citation	2
Student	6

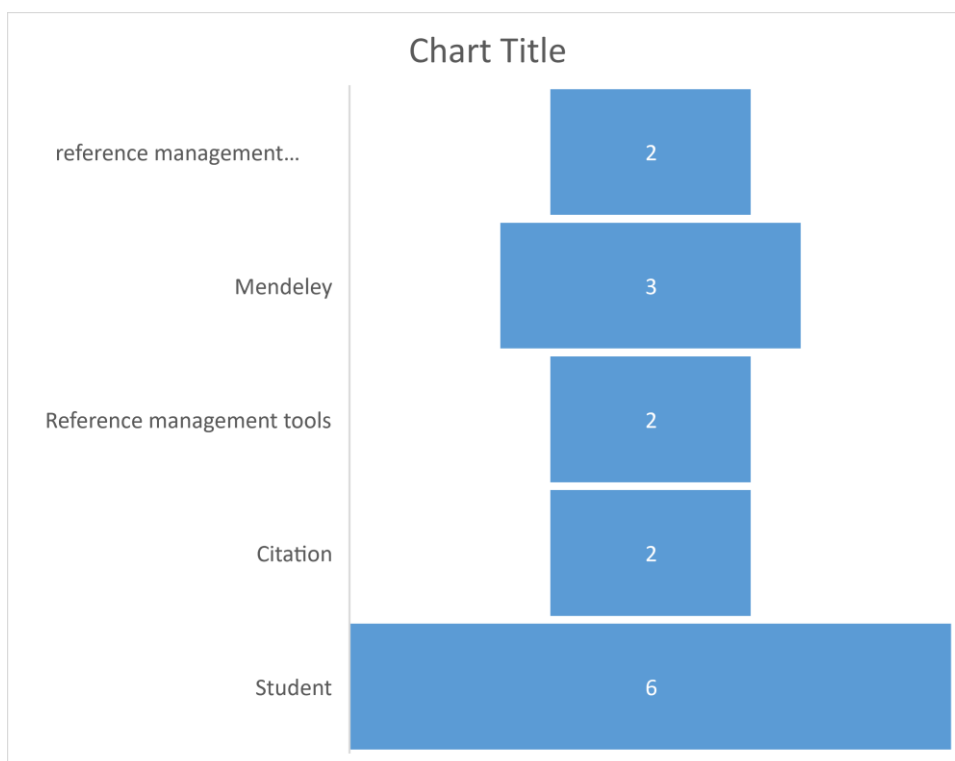


Figure 3: Abstract keyword frequency

Figure 3 reaffirms the data in Table 7 and demonstrates that "students" was the most often cited keyword in the abstracts. As the research centered on evaluating the technical appropriation related with RFS, this is not unusual. Multiple research included in the review indicate that students find reference management systems beneficial and effective for academic writing.

Table 8

Type of studies

Type	Count of type
Journal article	14
Conference paper	4
Total	18

The "type" of the studies considered in the review is presented in Table 8. According to the table, fourteen of the eighteen research included in the bibliometric study were journal articles, while four were conference papers. Figure 4 depicts the distribution of types in which journal and conference publications are referenced.

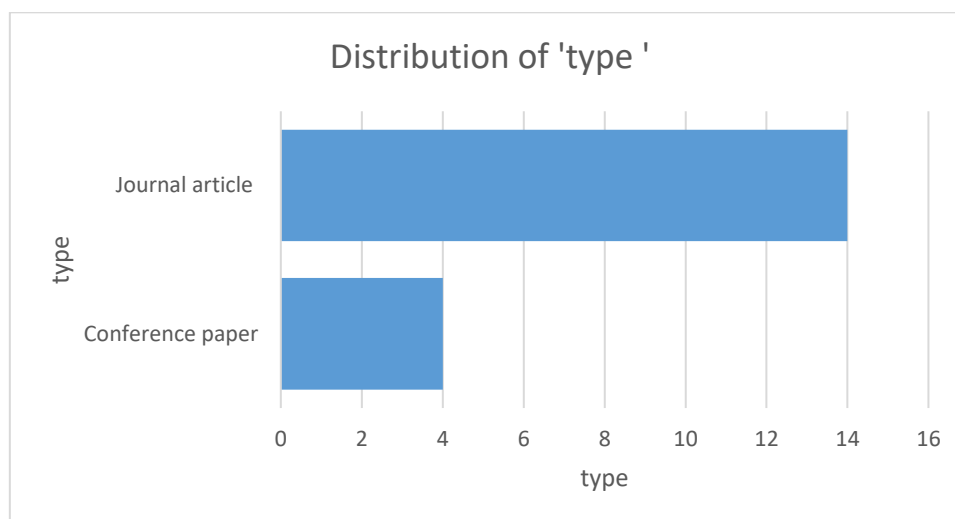


Figure 4: Distribution of the type

Because conference papers can supply researchers with a plethora of useful information and should be included in a literature review, especially in science and health, the researcher included them (Oshima & Hogue, 2007). In addition to journal articles, conference proceedings were cited because they provide a more thorough view of a particular topic of study and can help scholars uncover new areas of inquiry.

The strategies utilized by the included research are presented in Table 9. Eleven of the eighteen research displayed in the table utilized a quantitative methodology. In contrast, two of these studies used mixed approaches to collect and analyze data, including surveys and interviews. In addition, the remaining four of the five investigations followed a qualitative approach, with one study using ethnography, one using a case study style, one using a focus group, and the final using content analysis. One of the eighteen research evaluated the success of students' use of reference management software using an experimental design.

Table 9

Distribution of method in reported articles

Method	Count of Method
Quantitative	11
Mixed methods	2
Qualitative	2
Ethnography (Qualitative)	1
Case study (Qualitative)	1
Experimental	1
Grand Total	18

Figure 5 indicates that 61% of the studies were quantitative, 22% were qualitative, 11% for load, the mixed methods approach and 5.5% were experimental studies.

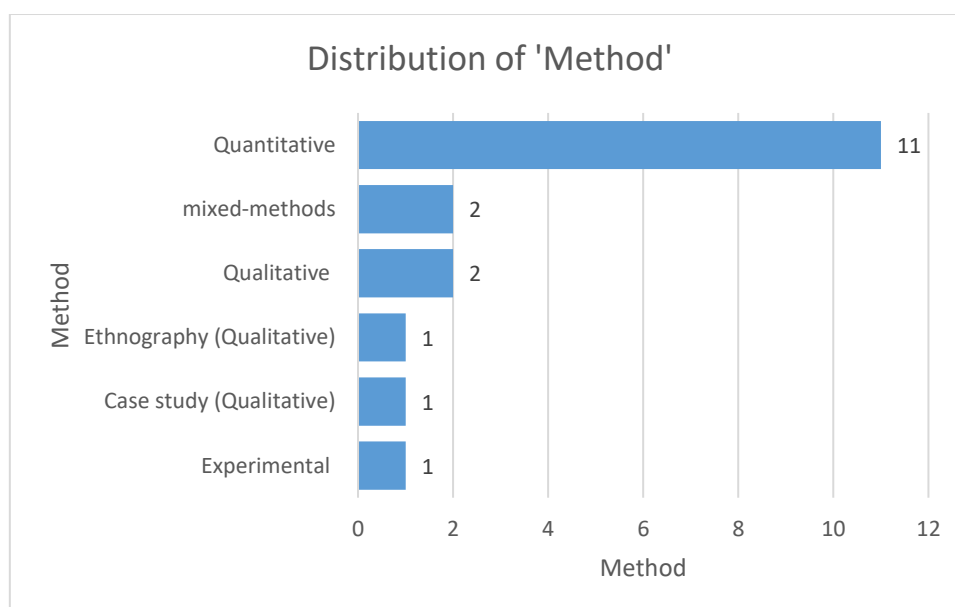


Figure 5: Distribution of method

Based on the category of publications, Table 10 categorizes the research methodology. Journal publications followed qualitative methodologies, while one qualitative paper (based on a case study methodology) was published as a conference paper. Eleven quantitative research were published as conference papers, while eight quantitative studies were published as journal articles. In addition, Figure 6 depicts the distribution type (conference paper and journal paper) and method (quantitative, qualitative, or mixed method) for each distribution type.

Table 10

Distribution of method based on the type of articles

Method	Count of type		Grand Total
	Conference paper	Journal article	
Quantitative	3	8	11
Qualitative		2	2
Mixed methods		2	2
Experimental		1	1
Ethnography (Qualitative)		1	1
Case study (Qualitative)	1		1
Grand Total	4	14	18

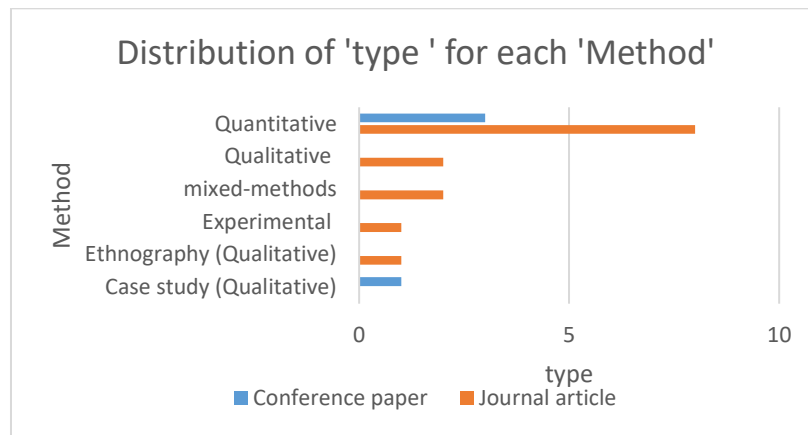


Figure 6: Distribution of type and method

3.3 Source and frequency evaluation through Vos Viewer

The final phase of the investigation was performed using VOSViewer. VOSViewer is utilized for density visualisation, a robust way for establishing correlations and interaction strength between study indicators, such as authors and keywords (An & Wu, 2011). Using VOSViewer, which has an authentic graphical user interface, the researcher generated density maps (Bahuguna et al., 2022). The density visualization of co-author incidence is depicted in Figure 7. There were 96 writers in total, and 16 clusters were developed. Based on the co-author overlap of 10 writers, Figure 8 illustrates the largest cluster.

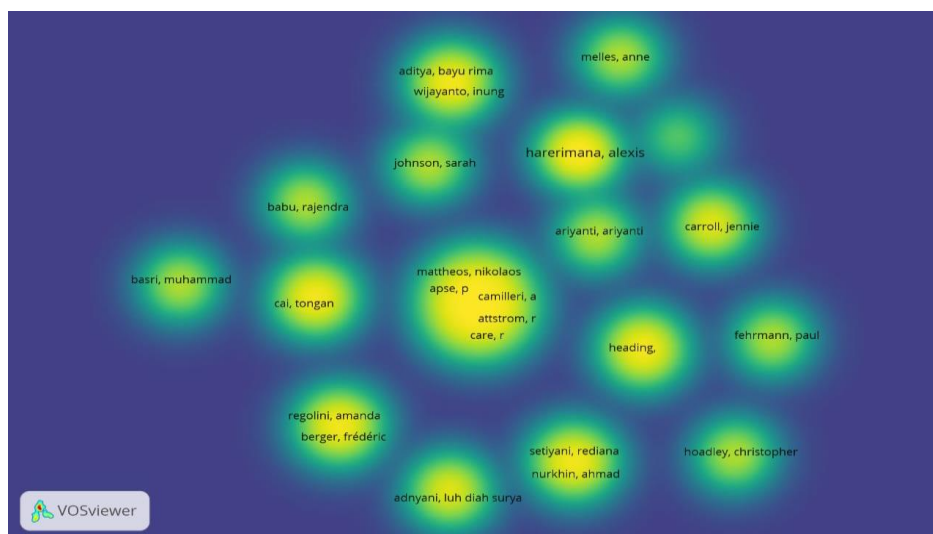


Figure 7: Cluster of Authors

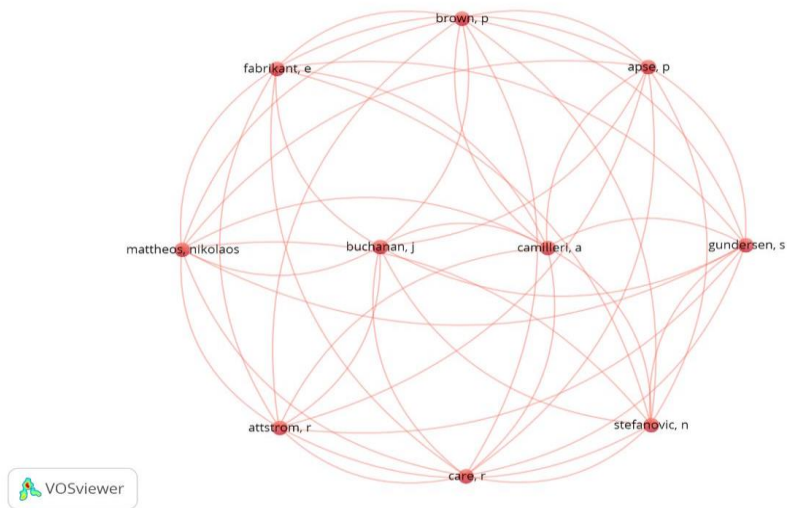


Figure 8: Cluster of Authors #2

Figure 8 depicts the density representation for the largest cluster depicted in Figure 7. The interwoven lines indicate that the research fields of the ten writers in the visualization overlapped.

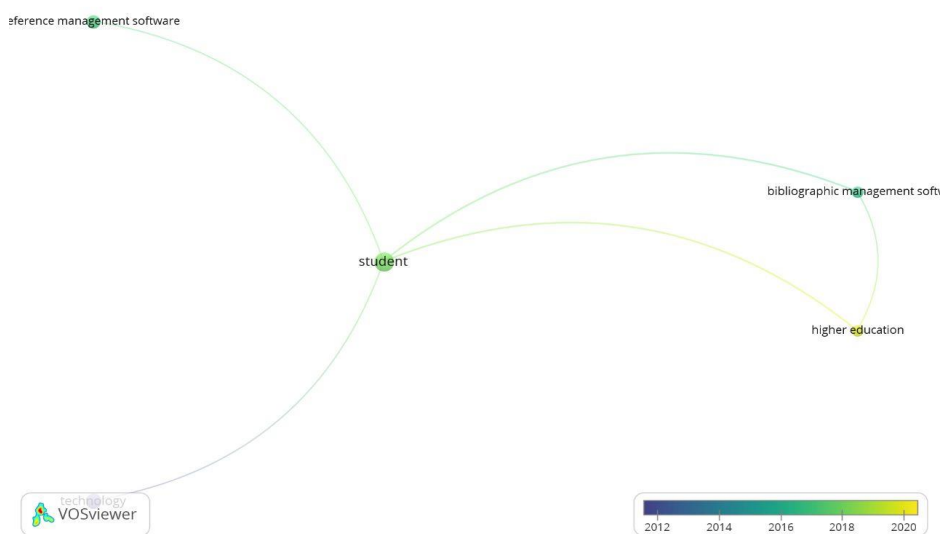


Figure 9: Keywords based on titles

The intersection between reference management software, technology, students, higher education, and bibliographic management tools is demonstrated in Figure 9. The center of the keyword density visualization was student perception, demonstrating its relationship to all other keywords. In addition, there was a correlation between bibliographic management tools and higher education, indicating that the research were concerned with evaluating bibliographic management tools in higher education and focusing on student opinions.

4. Findings

Over the past two decades, bibliographic reference management software has evolved into a popular innovation tool. This program is available in numerous forms and is used to manage references in a document (Mendeley, Zotero, Endnote, and Refworks). Many students view this program as a modern tool for conducting academic research. This is because reference management software encourages academic writing and critical thinking by presenting readers with credible sources. In recent years, e-learning and other digital teaching approaches have become increasingly popular in the education industry. Academic technological appropriation has the ability to advance knowledge and add to theorized literature. This is due to the fact that it frequently generates a large deal of student interest, resulting in a rise in the use of reference management software in research (Basri & Patak, 2015; Harerimana & Mtshali, 2019a; Regolini et al., 2008). Students' usage of bibliographic reference managers and other digital tools has increased significantly as a result (Basri & Patak, 2015; Lisbon, 2018; Nurkhin et al., 2019; Rangaswamy & Babu, 2021). Numerous earlier studies have therefore focused on the perspectives of students towards the usage of various modern technologies in the learning process. Prior academic research has examined the influence of reference management software (RMS) by examining its many types and functionalities. This research provides a novel bibliometric assessment of the RMS topic and evaluates how students utilize these software applications for academic reasons.

The data revealed that the majority of students view the use of these technology as good and advantageous to the learning process. Nevertheless, some students believed that technology can be difficult to utilize at times and that it is not always required in every learning environment. In order to accurately assess the breadth of the associated study field, a bibliometric analysis was conducted with appropriate search criteria, including the development of a 25-keyword list, including "Bibliographic Reference Managers;" "Technological Appropriation;" "Students' Perceptions;" "Information Communication Technology (ICT);" "Education;" "Information Technology;" "Web," and others. However, the keywords only generated five clusters, with students or student perceptions being the most prominent. In order to acquire a deeper understanding of this topic, a bibliometric analysis was undertaken using VOSviewer to analyze collected data. More quantitative studies were conducted on this topic than qualitative, mixed-method, and other experimental investigations, according to the study's findings. The majority of these research revealed that students from all parts of the world held favorable opinions on bibliographic reference managers and other technological resources. It was also established that these tools assist students in implementing their learning methods more efficiently and

easily. The study's findings enrich the existing research on the usage and perception of reference management software and tools and suggest specific areas for development. Researchers and developers can use the insights gained from evaluating the results reported in the previous section to improve and speed the development of this program for students. Given indicated by the tiny sample size of the bibliometric study, the research is also interesting from a theoretical standpoint, as there has been little previously published research on this issue.

5. Discussion

The majority of the data collected for the bibliometric analysis fell between 2002 and 2021. In order to reach final conclusions, a total of eighteen documents were evaluated. In accordance with the methodology, each study adopted distinct methodologies. The majority of the included publications focused on quantitative mechanisms, while two employed qualitative approaches and two employed hybrid methodology. Also reviewed were ethnography, case studies, and experimental investigations. As a result of reviewing the journal papers, it has been determined that students from various ethnicities/geographies have diverse viewpoints on reference management software. The extent of students' use of bibliography reference management software is also unique and distinguishable (Harerimana & Mtshali, 2019b; Salem & Fehrmann, 2013). Prior to the invention of reference management software, the majority of citations had to be completed manually, which diminished the credibility of research involving multiple authors. The students' knowledge supplement is disproportionately dependent on the institutions to which they belong. By utilizing this program, pupils facilitate numerous academic advantages. Basri and Patak (2015) found that students' perceptions of reference management software prioritized academic integrity as the most important component of boosting economic integrity and ignoring, minimizing, and preventing academic dishonesty. The results demonstrate that the reference management software was straightforward and simple to use for the majority of students. Nonetheless, some students continue to struggle with adopting bibliographic collaboration and maintaining a virtual existence.

The majority of students and researchers utilize reference management software in order to collect, organize/manage, and prepare citations and references. Different reference managers necessitate varying levels of work, and it has been discovered that the majority of students choose strategies that require less effort. It has also been shown that reference managers share comparable traits and that there is differentiation or variation in organizational and presenting viewpoints (Cai et al., 2021). It has been observed that the use of reference managers such as (Mendeley, Endnote, Zotero, and RefWorks) has become essential for lecturers and students while producing scientific papers. The University of "The Faculty of Economics of the State of Semarang" has encouraged its pupils to utilize reference managers when composing a dissertation. The desire of students to utilize a reference manager is strongly and positively influenced by performance anticipation and social influence. The effort expectation described in the study results by Nurkhin et al. (2019) was not indicated and had a major impact on the use of reference management software.

However, the study also demonstrated that other factors, including lecturer guidance, behavioral intention, and policy pressure, do not significantly influence the use of reference managers. A student's perception of bibliographic reference management is based on their perception of the utility of reference managers. Reference management software plays a significant part in research, as reference management and organizing strategies for a valid citation with a consistent style are difficult to achieve manually. Students think that this program facilitates their research efforts. Reference management serves a crucial function in preventing the inclusion of substandard work, which is deemed immoral if not cited appropriately. Researchers have also emphasized the relevance of ensuring that scientific articles contain sufficient citations. Different reference management software features interest students who use RMS for thesis writing or other research projects. Because handling a big collection of references manually or otherwise was not possible, students view this technological innovation as convenient and practical for academic writing. Reference management practices are personal choices that do not necessarily instruct the use/adoption of reference management software. Numerous personal and institutional variables explain the adoption of these practices. Few users consider the software's important features (Melles & Unsworth, 2015).

6. Conclusion

Currently, the educational sectors are transitioning from traditional teaching and learning methods to e-learning and teaching approaches. Utilization of bibliographic reference managers and other digital technologies has expanded dramatically in this direction. This has prompted numerous previous research to focus on the students' utilization of various sophisticated technologies during the learning process. Students' perceptions on the use of bibliographic reference managers and their technological appropriation prompted the present research. Due to the breadth of the associated subject field, a bibliometric analysis was done for this research work. For this purpose, appropriate search criteria were developed, including the compilation of a list of 25 keywords: "Bibliographic Reference Managers;" "Technological Appropriation;" "Students' Perceptions;" "Information Communication Technology (ICT);" "Education;" "Information Technology;" "Web" and others. These keywords have been included in numerous online databases, including Science Direct, IEEE, Wiley Online, Mdpi, Francis and Taylor, Emerald, Springer, and Scopus. From 2022 to 2021, around 18 articles and papers were selected and published. Appropriate methods were adopted to identify pertinent bibliometric data for the current investigation, and the gathered data were subsequently analyzed using VOSviewer. This bibliometric analysis revealed that qualitative, mixed method, and other experimental investigations were undertaken less frequently in this setting than quantitative studies. The majority of these research revealed that students from various regions of the world had good attitudes about bibliographic reference managers and other technological tools that facilitate more effective and efficient implementation of their learning strategies.

7. Research Implications

Various practical and theoretical consequences are thought to be facilitated by the findings of the present investigation. The present study's approach to the use of bibliographic reference managers and technological appropriation in the setting of students will contribute to the advancement of theoretical understanding in this area. This study will also contribute to the bibliometric studies undertaken in this field, as many have been conducted previously. This will motivate future academics to concentrate on the use of bibliographic reference managers and technology appropriation within the setting of students. In addition to these theoretical ramifications, the present analysis has numerous practical applications. This study, for instance, will be useful in enticing many educational sectors to take significant measures for integrating diverse and advanced technology into teaching and learning techniques in order to cultivate analytical and critical abilities among students. This research will also aid in providing students with crucial advice for using various bibliographic reference systems. As a result, many students will be able to properly apply these reference managers in their assignments and dissertations for positive results. In addition, the present study will be effective enough to promote the application of various education-related policies to the promotion of new technologies in various educational sectors.

8. Limitations and Suggestions for Future Research

Each research study has limitations. Similarly, the present research study features a number of limitations that could offer new avenues for future researchers. It has been observed that in determining the perception of the use of bibliographic reference managers and technological appropriation among students, bibliometric analysis was employed due to researcher bias, and no consideration was given to the thoughts and experiences of associated stakeholders in the real world. Another constraint of the present bibliometric analysis was the minimal number of selected conference papers and articles. Due of their accessibility, the researcher utilized only 18 journal articles and conference papers. This prohibited an efficient approach to the subject at hand. Due to the researcher's comprehension, the timeframe of bibliometric data for the present study was confined to 2002 to 2021. In addition, the present study was limited to analyzing obtained data with VOSviewer. This mapping technique was utilized in the study due to its simple application.

These deficiencies of the present study can be addressed in future research if the necessary steps are taken. Thus, future research can concentrate on a variety of model-based and interview-based studies to investigate students' perceptions of bibliographic reference management and technological appropriation. This can efficiently gain a comprehensive understanding of the topic's connected stakeholders in a particular situation. In addition, future bibliometric research in this context will be able to collect a significant sample of conference papers and journal articles in order to produce useful results. In this sense, selecting a longer duration for the collecting of bibliometric data can also be advantageous. These adjustments to future studies may also inspire future researchers to employ other mapping methods, such as the "Bibliometrix package of R software," for analytical purposes.

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