



RESEARCH ARTICLE

# Pre-Service Teachers' Resilience Research Using Vosviewer: Bibliometric Analysis

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## ARTICLE INFO

Received: Oct 17, 2024

Accepted: Dec 4, 2024

### Keywords

Bibliometric analysis  
Pre-service Teachers  
Resilience

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## ABSTRACT

Changes in routine practices due to the Covid-19 pandemic, particularly in the education sector, have created chaos worldwide. As a result, educators, who also serve as executors of changes in the school, must be highly resilient in facing challenges and unexpected circumstances. Resilience refers to an individual's ability to survive and not give up in the face of adversity. It is also a form of stress-reduction agent. As a result, researchers must conduct more research on resilience and publish their findings in various media, including newspapers, social media, and journals. This study aims to conduct a bibliometric review to assess the scope of research on pre-service teachers' resilience. The Scopus database was used to gather information about pre-service teachers' resilience studies. For this research, the five-stage method was used. It is defining search keyword, initial search results, refinement of search results, compile preliminary data statistic and data analysis. Topic areas with titles, keywords, and abstract criteria were used as a reference to obtain the relevant works. Publish or Perish (PoP), Zotero, and VOSviewer were used to extract search results. The results of the bibliometric mapping were then examined thoroughly. Out of the initial 64 articles retrieved from the Scopus database in July 2021, 43 articles were retained for review. While the number of publications about pre-service teachers' resilience has increased significantly between 2016 and 2021, the number of studies is still low. Most of these studies were conducted in Australia, and several keywords, specifically pre-service teachers, resilience, and impact, emerged as the most widely used keywords in these studies. Implications of the findings and future research directions are also discussed. Using VOSviewer, we examined how many articles had been published about pre-service teachers' resilience and relationships to a topic area. The review can undoubtedly serve as a starting point for future research on pre-service teachers' resilience.

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## 1. INTRODUCTION

In general, resilience refers to a person's beliefs, abilities, skills, and personality in facing trials, difficulties, and obstacles. They are distinct characteristics that exist in humans. Resilient teachers are defined as individuals who can thrive in difficult situations, are skilled in managing behaviour, and can empathise with the difficulties faced by the students. These teachers can turn negativity into positivity, are proud of their school and profession, and are highly committed to their school and profession (Mansfield, 2016). Furthermore, resilience is defined as the determination and ability to maintain or maintain well-being in any situation, including external risk conditions (risk conditions) such as not experiencing trauma, not suffering from chronic illness, and so on, based on peace of mind, emotions, and self-confidence (Wagnild & Young, 1993). According to (Richardson, 2002), those who are resilient can withstand and adapt to a stressful environment. In this light, the lack of perseverance and endurance is frequently linked to stress. This is because many previous studies have linked pressure with low resistance (Baharin & Mariam, 2010).

The unprecedented crisis caused by the Covid-19 pandemic has led to many unexpected situations. The pandemic has changed people's daily routines. The most significant event we experienced during the pandemic is the implementation of teaching and learning during the Movement Control Order (MCO) period. However, we must be aware that the psychological element must also be taken care of. Looking from academic excellence and positive psychological elements such as optimism, hope, and self-efficacy among students and educators also need to be taken seriously. Previous studies have shown a high interest in studying positive psychology (Luthans, Youssef, & Avolio, 2007; Luthans, Avey, Avolio, & Peterson, 2010; Rego, Marques, Leal, Sousa, & Pina e Cunha, 2010; Wright, 2010). Therefore, to ensure the smooth implementation of education, psychological aspects, such as teachers' resilience, need to be taken care of. This is because individuals with positive relationship characteristics will be more proficient in problem-solving and have the motivation to improve themselves are labelled as resilient individuals (Herrman et al., 2011). Thus, to face the various challenges of participating in the teaching profession more effectively, an individual needs to have a high level of positive psychology (Luthans, Youssef, & Avolio, 2007). Teachers as implementers face a considerable task due to the various workloads and challenges they need to face to produce knowledgeable human beings.

However, studies have shown an increase in stress symptoms among teachers (Newberry & Allsop, 2017; Sajida, 2018). This proves that there is a lack of resilience among teachers. (Raphael, Sari, & Surat, 2020) supported that lack of resilience because of stress. The situation lack of resilience does not only occur among in-service teachers. Studies have also found a higher stress level among novice teachers (Nguai & Lay, 2020). Even low resilience problems also occur among pre-service teachers because of stress (Mohamad Faizel & Nor Shafrin, 2020; Hasnah, 2016). Therefore, there is a need to increase research on resilience among pre-service teachers. In addition, studies on pre-service teacher's resilience need to be explored more thoroughly, extensively, and in-depth concerning resilience. It is because resilience is one of the positive psychological elements that must be present in every individual. Based on these issues, this study sought to close a research problem by conducting a comprehensive bibliometric analysis of the literature related to pre-service teacher resilience. This issue needs to be seen to review the articles that have studied pre-service teachers' resilience and the gaps that can still be investigated.

This study involved searching the Scopus database for articles and categorising them according to the authors' distribution and combination. This analysis can help decide which research studies are used in the titles of many other journals and future 'pre-service teachers' resilience' topics that offer possibilities for additional study. The analysis was carried out using bibliometric analysis, including Scopus data and Publish or Perish (PoP) software. Finally, the results of the VOSviewer analysis will be presented, discussed, and conclusions from the literature review will be drawn using the bibliometric analysis.

## 2. METHODOLOGY

The bibliometric review of literature is based on a comprehensive and specific process (Garza-Reyes, 2015), specifically, a mind mapping method emphasizing knowledge limits (Tranfield, Denyer, & Smart, 2003). For this research, the five-stage method was used (Hamidah, Sriyono, & Hudha, 2020; Setyaningsih, Indarti, & Jie, 2018; Tranfield, Denyer, & Smart, 2003)

**Figure 1 - Five-step method bibliometric analysis**

1	2	3	4	5
<i>Defining search keyword</i>	<i>Initial search results</i>	<i>Refinement of search results</i>	<i>Compile preliminary statistic</i>	<i>Data analysis</i>

The publications in this study were retrieved from the Scopus database, which is one of the world's largest peer-reviewed journal databases and a reliable source of scientific academic material (Klapka & Slaby, 2018).

## 2.1 Defining Search Keywords

In July 2021, a systematic literature search was conducted using the keyword 'pre-service teacher resilience.' Scopus was chosen because it is the largest academic database at present. Meanwhile, the Publish or Perish software was chosen. It has been proven as one of the most effective ways of searching articles for a systematic literature review of interventions to increase the academic publication rate (McGrail, Rickard, & Jones, 2006). The first keyword search involved querying language to Publish or Perish (PoP) software with the keyword 'pre-service teacher's resilience.' The Scopus Database is only searchable in Publish or Perish (PoP) by using the API Scopus link after signing in.

## 2.2 Initial search results

During this phase, the search was conducted specifically for articles that fulfil the criteria, 'open access', 'journals', 'keyword' only, and the year '2016-2021'. 64 articles were found during the initial search. The search results in Publish or Perish (PoP) were then compiled and saved in the RIS format file. Then the file was converted to the Zotero Software format to edit and repair. This format includes important article information, such as paper titles, author and affiliation names, abstracts, keywords, and references.

## 2.3 Refinement of search results

A refined search was conducted on the Scopus database to filter the relevant and indexed articles. However, only journal articles were chosen, and proceedings, newspapers, books, book reviews, or book chapters were not included in the review. Subsequently, out of the 64 initial articles, 43 were retained. After screening to make the necessary improvements, the file was saved into a RIS file. Then, the RIS data were imported into the RIS Zotero software. The generated RIS file was used to prepare the data for analysis. The detailed screening process is shown in Figure 2.

**Figure 2 - Screening process**

Search Screening	Number of articles
Double	1
Book	2
Review	2
Chapter	9
Editorial	2
Conference paper	2
Review	2
Note	1
<b>Total</b>	<b>21</b>

## 2.4 Compiling the preliminary data statistics

The Publish or Perish (PoP) data was exported and saved as the RIS file. Initially, the essential components of the journal articles (publication year, volume, number, page, etc.) were checked using Zotero Software, and any missing information was filled in. Data analysis was then performed by classifying the articles based on year, source of publication, and publisher. The data were then imported into the RIS format and analysed in the VOSviewer

## 2.5 Data analysis

The Publish and Perish software was used for the bibliometric analysis. VOSviewer software, on the other hand, was used to analyse and visualise the bibliometric networks. VOSviewer is popular due to its ability to work efficiently with large data sets while also providing various attractive visual, analytical, and investigative options (Van Eck & Waltman, 2010). The VOSviewer can also create

publications, authors, or research paper maps presenting the collaborative networks and keyword maps based on shared network systems.

### 3. RESULTS

#### 3.1 Publications and citation structures

The output was examined using the PoP software and the VOSviewer software to determine the most frequently occurring keywords. The number of the frequently occurring keywords, on the other hand, was adjusted to meet the needs for data collection and analysis. The VOSviewer is a tool for visualising bibliometric maps. It displays bibliometric mapping on three different visualisations: network, overlay, and density. The researcher conducted a comprehensive search of the Scopus database for articles with the keyword 'pre-service teachers resilience.' published between 2016 and 2021. Based on the initial results, approximately 81 articles with 817 citations (62.85 citations per year) were obtained. The first refined search process retained 64 articles with 355 citations (71 citations per year). After the final refinement of results, 43 articles were retained with 170 citations and 34 citations/year. Table 1 shows the complete results of the metric data comparison between the initial search and the enhanced search.

**Table 1 - comparison metrics keyword 'pre-service teachers resilience' with publication year 2016-2021**

Metric data	Initial search	Refinement Search 1	Refinement Search 2
Keyword search	'pre-service teachers resilience.'	'pre-service teachers resilience.'	'pre-service teachers resilience.'
Source	Scopus database	Scopus database	Scopus database
Publication year	2008-2021	2016-2021	2016-2021
Papers	81	64	43
Citation	817	355	170
Cites/year	62.85	71	34.0
Cites/paper	10.09	5.55	3.95
Author/paper	1	1	1.0
h_index	13	9	7
g_index	27	17	11
hl_norm	13	9	7
hl_annual	1.0	1.8	1.40

As this study aims to determine the most relevant contribution, the next step is to find articles with the highest citation score (top 3 cited articles). The results are shown in Table 2.

**Table 2 - Top 3 Cited articles**

No	Publication Year	Author	Title	Journal	Cites	Publisher
1	2017	Crosswell, L., Beutel, D	21 <sup>st</sup> century teachers: how non-traditional pre-service teachers navigate their initial experiences of contemporary classrooms	Asia-Pacific of Teacher Education	18	Routledge

2	2019	Marom, L	Under the cloak of professionalism: covert racism in teacher education	Race Ethnicity and Education	11	Routledge
3	2016	Maaranen, K., Pitkäniemi, H., Stenberg, K., Karlsson, L.	An idealistic view of teaching: teacher students' personal practical theories	Journal of Education for Teaching	10	Routledge

The top 3 publishers of articles on the topic listed in Table 3.

**Table 3 - Top 3 publishers who publish pre-service teachers resilience topic**

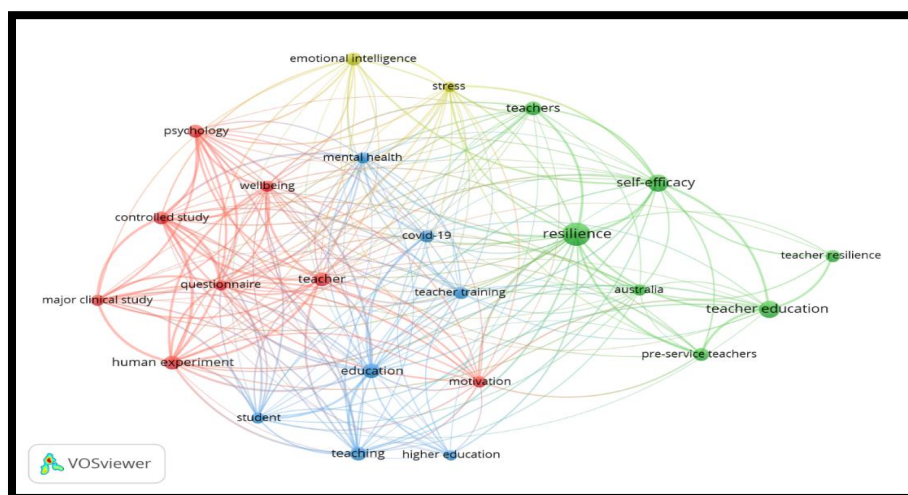
No	Publisher	Articles
1	Routledge	13
2	Springer	5
3	Elsevier	4

Journals that have relevant articles are presented in Table 4.

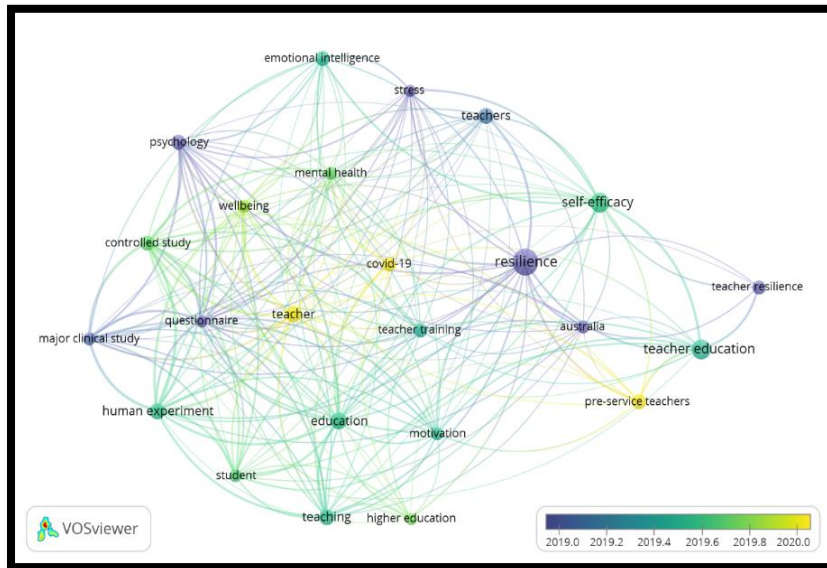
**Table 4 - Top 3 journals that have relevant articles on pre-service teacher's resilience topic**

No	Journal	Total Articles
1	Teaching and Teacher Education	3
2	Australian Journals of Teacher Education	2
3	Teacher Development	2

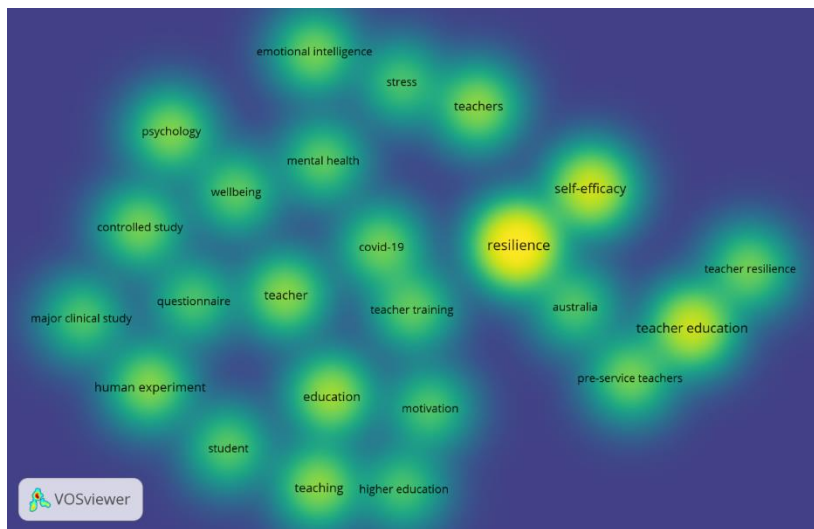
Figure 2 shows the data network visualisation of Scopus data related to the keyword "pre-service teachers resilience" during the refined search. Figure 3 shows the overlay visualisation, and Figure 4 shows the density visualisation.



**Figure 3 - Network visualisation on the Scopus database**



**Figure 4 - Visualisation of overlays in the Scopus**



**Figure 5 - Visualisation of density in Scopus**

The results were extracted from the title, keywords, and abstract using the software VOSviewer. The calculation of the minimum number of events was set to 20. We found about 24 items out of 2605 items on the keywords, and 33 met the threshold. This item does not include common words. Each item representing a keyword is added, as indicated by the size of the node. In other words, the node measure indicates the frequency with which the keyword appears. In this case, four groups were identified. Table 5 presents the keywords used in each group of studies to represent pre-service teachers' resilience studies.

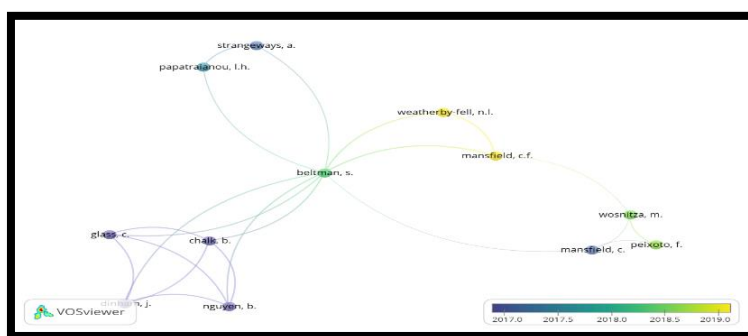
**Table 5 - Keywords used in each group to represent pre-service teachers' resilience studies.**

No	Cluster	Element
1	The first cluster (red)	Human experiment, major clinical study, questionnaire, teacher, human experiment, controlled study, psychology, motivation.
2	The second cluster (green)	Teachers, resilience, self-efficacy, Australia, pre-service teachers, teacher education, teacher resilience.

3	The third cluster (blue)	Mental health, covid-19, teacher training, education, student, teaching, higher education.
4	The Fourth cluster (yellow)	Emotional intelligence, stress

### 3.2 Authors and co-authorship relations

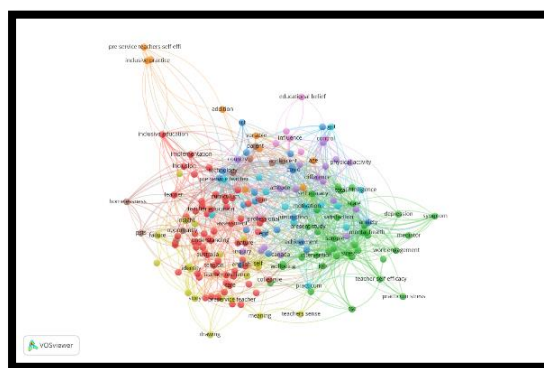
Figure 5 depicts an investigation of collaborative networks concerning patterns of collaboration among individual authors. Each node in this network represents the author's connection to the writing. This analysis can incorporate a variety of dimensions to visualise groups and associations between dimensions or time changes. Figure 5 depicts an analysis of the author's network as it evolved over the years. In this case, most authors collaborate with others on an annual basis. It has been established that Beltman, S is the author with the most collaboration with other authors, and the author has established the most recent relationships with other authors. Lines marked yellow depict the relationship between Beltman, S. and other authors.



**Figure 6 - Visualisation of Overlay Authors and co-authorship relationships in the Scopus database**

### 3.3 Title and abstract statistic

The title and abstract statistics were extracted using RIS files in VOSviewer. The minimum accuracy rate is 30 out of 12496 items. The results of the study reported that that 182 items met the threshold. In this light, the title and abstract on pre-service teachers resilience are examined as in Table 1. While articles with this keyword started to appear in the database starting from 2008, there are still relatively few factors associated with pre-service teachers' resilience, as shown in Figure 2. Recent studies on resilience on pre-service teachers have also been inconsistent. Figure 7 depicts a visualisation of the overlaying and related title and abstract of articles on pre-service teachers' resilience in the Scopus database. In this study, it was found that most studies on pre-service teachers' resilience have been conducted in developed countries with high educational standards, such as Australia and Finland. Thus, we should look into why resilience among pre-service teachers is widely discussed in these countries.



**Figure 7 - Visualisation of overlay title and abstract pre-service teacher's resilience and relations on the Scopus database**



#### 4. DISCUSSION AND CONCLUSION

This study has identified the number of citations of each journal article reviewed. As shown in Table 2, Crosswell L et al. received the most citations in the Scopus database in 2017. This article discussed how teachers must be resilient to thrive in these high-stress, often conflicting environments (Crosswell & Beutel, 2017). This article has been cited in over 18 research papers. Meanwhile, according to the data, the publisher with the highest frequency of citation is Routledge.

Moreover, the publisher who published the most articles on this topic was scrutinised. 13 of the 43 articles were published by major publishers, namely Routledge, with 5 articles published by Springer and 4 articles published by Elsevier. On average, 1 article was published on this topic by other publishers.

In addition to the number of research papers by each publisher, the journal's relevance is considered. In this regard, the top 3 journals that cover the topic were identified. There are some journals with the most citations, such as Routledge. This demonstrates that articles on pre-service teachers' resilience are scattered in various publications.

The overlay visualisation and density visualisation analysis was used to identify key themes in each study or domain of knowledge. This is accomplished by calculating the co-occurrence of keyword pairs (Liu, Yin, Liu, & Dunford, 2015; Nagy, 2018). VOSviewer software was used to conduct the analysis. It is clear that each cluster is linked to other keywords. This result implies that the advancement of research on this subject is related. The author's authority can also be determined using network analysis (Bilik, H. Damar, G. Ozdagoglu, A. Ozdagoglu, & M. Damar, 2019). A popular bibliometric research technique investigating authors collaborations on studies in a subject area is known as joint author analysis. The author's authority can also be determined using network analysis.

Many authors who have jointly written articles about pre-service teachers' resilience come from western countries. This writer's geographical distribution demonstrates that research on pre-service teachers is still dominated by western countries, particularly Australia and Finland. Overall, this data enables this paper to determine the research trends in pre-service teachers research in the last 5 years. Some non-used words can be linked and examined further in future studies. As a result, many more topics can be developed based on these keywords, such as affiliations, cities, and countries. These previously mentioned elements may provide a more comprehensive analysis.

The study examined articles with the keyword "pre-service teachers' resilience." The Publish or Perish software collected articles from the Scopus database. 43 articles were chosen from a larger pool of 65 articles published between 2016 and 2020. To achieve the study's objectives, all articles retrieved from the database were classified by author, year of publication, name of the publisher's journal, citations, author and co-authorship relationships, and affiliation statistics.

Our finding revealed that most authors of articles on pre-service teacher resilience come from Australia and the United States. Consequently, most studies have focused on western countries. The gap in this research on the Malaysian context demonstrates the direction for the future agenda: pre-service teachers' resilience must be studied. Overall, research into the concept of resilience is increasing, albeit slowly, from year to year. As a result, it is necessary to demonstrate that the idea of resilience, particularly among pre-service teachers and in-service teachers, must be highlighted in advance.

#### 5. Suggestions/Limitations

There are two limitations to this study. First, the review was based on a set of keywords and may be constrained by the limited database used for article collection; specifically, the Publish or Perish, the maximum search data is 1000 articles second, despite using formal software such as Publish or Perish (PoP), VOSviewer, and Zotero in this study, subjective evaluations of the authors were still conducted and may still result in errors. Future studies should use a larger sample size by broadening the keywords used and using a more accessible database.

The authors suggest that it can be used directly through the Scopus database account and save the search data in RIS Form before being analysed. It is even possible to compare the results of different



and recommended bibliometric analyses such as BibExcel and Mendeley. In addition, it is advisable to increase the number of relevant studies to provide a more detailed explanation because many studies have discussed the resilience of pre-service teachers. This is important because based on the search for connections and relationships through VOSviewer, it is found that resilience is very close to stress, burn out and so on. Therefore, researchers must go into detail in analysing the factors that affect resilience because awareness of resilience among students should be the focus, as the lack of resilience among students could be a source of pressure (stress) (Raphael, Sari, & Surat, 2020).

The review found that most studies on the resilience of pre-service teachers were conducted in western countries compared to Asian countries. This shows that developed countries have begun to realise the importance of building resilience among pre-service teachers. Therefore, Malaysia, as a developing country, should increase research on resilience building among pre-service teachers. This is because; developing countries such as Malaysia need to improve the country's educational performance in the world rankings. It is therefore hoped that more studies examining the resilience of pre-service teachers in ensuring the importance of resilience among teachers in the national education system as resilient individuals can face various challenges (Tasleem, 2013, as cited in Norasmah, 2017).

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