MOST-CITED RESEARCH PUBLICATIONS ON EDUCATIONAL LEADERSHIP AND MANAGEMENT: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

There is a growing interest to understand the knowledge base in the area of educational leadership and management (EDLM) due to exceedingly large number of articles published. This study aims to explore the knowledge base within the highly cited papers of EDLM and their characteristics using science mapping. The 100 most-cited papers out of 5680 publications generated from Scopus database were utilised in bibliometric analysis. VOSviewer software was used to conduct bibliometric analysis such as co-citation and co-occurrence. The analysis identified that 100 most-cited papers were published between 1981 to 2018. The results showed that 12 countries contributed to the 100 most-cited publications with the most productive country being the United States, followed by United Kingdom, Canada, Netherlands, Hong Kong, and Australia. Findings also revealed United States representing maximum collaboration with other countries. The analysis identified that Kenneth Leithwood and Philip Hallinger were the greatest contributors to the highly cited articles. The most repeated key words were; leadership, school leadership, social justice, transformational leadership, educational leadership, and principals. Main schools of thought such as leadership for social justice were related with these key terms. The majority of publications came from Educational Administration Quarterly followed by Journal of Educational Administration, and School Leadership and Management. The results of this study helped to identify important areas guiding impactful research opportunities. Scholars looking forward to undertake research on EDLM can consider the major schools of thought that were identified in this analysis.

Keywords: Bibliometric analysis, Educational leadership, Educational management, School leadership, Science mapping.

INTRODUCTION

Research on educational leadership and management (EDLM) has unfolded in countries on almost all the continents in the world (Bush, 2018). The emergence of research on EDLM in various regions of the world has contributed to large volume of publications during the past few decades (Hallinger, 2020). However, number of publications alone is not an indication of quality of publication and it does not indicate the impact of the research (Agarwal et al., 2016). Thus, citation becomes a commonly used parameter to evaluate the impact of a publication or work of a researcher (Moed, 2009). Additionally, number of highly cited papers are used in several international ranking systems to assess university rankings globally (Hossain & Ahmed, 2020). Thus, measuring the impact of scholarly work in terms of their citation has received more attention in different fields.

Identifying highly cited articles in a particular field helps researchers to get familiar with landmark work in the field and provides a direction for future research (Azer, 2015). As a

result, recent studies have identified 100 most-cited articles in various fields such as; health and medicine (Brinjikji, Klunder, & Kallmes, 2013; Elarjani et al., 2020; Garcovich, Marques Martinez, & Adobes Martin, 2020; He et al., 2020; Kolkailah et al., 2019; Liu et al., 2016; Lu et al., 2019; Matthews, Abdelrahman, Powell, & Lewis, 2016; Sinha, Iqbal, Spence, & Richard, 2016; Sreedharan, Mian, Robertson, & Yang, 2020; Walsh et al., 2018; Zhao, Shen, Zhang, et al., 2020; Zhao, Shen, Zheng, et al., 2020), teaching and learning (Shareefa & Moosa, 2020), educational technology (Lai, 2020), business and management education (Arbaugh & Hwang, 2015; Ritter, 2015), workplace learning (Moosa & Shareefa, 2020), and social work (Hodge, Lacasse, & Benson, 2012). Interestingly, 100 most influential publications on leadership in healthcare was analysed using bibliometric analysis (Bhulani, Miao, Norbash, Castillo, & Khosa, 2020). These literatures illustrate that finding the characteristics of most-cited publications is a common practice among the scholars in the health and medical field compared with other social sciences.

Due to the vast knowledge production, researchers in the field of educational leadership and management started to explore the knowledge base on EDLM across regions and countries using science mapping technique and bibliometric analysis (Castillo & Hallinger, 2017; Gümüş, Bellibaş, Gümüş, & Hallinger, 2020; Hallinger, 2019a, 2019b, 2020; Hallinger & Hammad, 2019; Hallinger & Kovačević, 2021; Kovačević & Hallinger, 2019). However, these reviews relied on seeking trends and "insights into the evolving global knowledge base in EDLM" (Hallinger, 2020, p. 210) and were not confined to identify the characteristics of the most-cited articles in the field. Meantime, some of the reviews identified very limited number of (such as 15 or 20) most-cited publications within the scope of educational leadership, management and administration (Hallinger & Kovačević, 2019; Tian & Huber, 2019). Nevertheless, a full range study focusing on most influential publications is required in the field. To the authors' knowledge, there is no bibliometric analysis regarding 100 most-cited publications on EDLM. Therefore, the aim of this study is to examine the characteristics of 100 most-cited articles on educational leadership and management. Hence, a bibliometric analysis was conducted to fill the identified gap in the literature. This analysis addressed the following research questions:

1. What is the pattern of publications and citations of the 100 most-cited articles on educational leadership and management (EDLM)?

2. What is the pattern of contribution and collaboration of various countries to the publication of the 100 most-cited articles on EDLM?

3. What are the contributing scholars and author co-citation network based on 100 most-cited publications on EDLM?

4. What are the most frequently used authors' key words that are used in the 100 most-cited articles on EDLM?

5. What are the top journals that have published the 100 most-cited articles on EDLM and the characteristics of these journals?

As encouraged by Hallinger and Kovačević (2021), this study attempts to review knowledge accumulation in the field of EDLM on a very specific line of enquiry; information related to most-cited articles in the field. These "highly cited papers can be

representative of the latest changes in specific research issues" (Lai, 2020, p. 721), showing more prominent areas in this field of research.

METHODOLOGY

Data Search and Identification

Possible and commonly used sources to search and extract data for bibliometric analysis include: Web of Science (WoS), Scopus, and Google Scholar. However, selection of the most appropriate source (online database) for a specific research field is an important step in a bibliometric data search. Among the three sources, Elservier's Scopus database was used for data search in this study, because it was considered the most satisfactory index for use in a bibliometric analysis in the field of EDLM compared with WoS and Google Scholar (Hallinger, 2019a). WoS offers limited coverage of publications in social science (Mongeon & Paul-Hus, 2016), and it is incapable to provide a comprehensive picture of past studies for a review of EDLM research (Hallinger, 2019a). Furthermore, Google Scholar was not used in this review due to number of reasons, including; i) lack quality control required for bibliometric analysis (Aguillo, 2012), ii) low quality data in the database (Mongeon & Paul-Hus, 2016), iii) some publications in this database are incompatible with those provided in other databases (Aguillo, 2012), and iv) having constraints to retrieve bibliometric data from the database (Moosa & Shareefa, 2020).

The initial search was performed to identify full range of publications in the Scopus database on 29th August 2020. The following search terms were used in the initial data search stage: "educational leadership", "educational management", "school leadership", and "educational administration". The initial search was restricted to article title, abstract, and keywords. Apart from this limit, the following inclusion parameters were set to refine the search.

- Date: 1960 to 29 August 2020

- Document Type: articles, research reviews, conference papers

- Language: English

Therefore, following string was used in the final search; *(TITLE-ABS-KEY ("educational leadership") OR TITLE-ABS-KEY ("educational management") OR TITLE-ABS-KEY ("school leadership") OR TITLE-ABS-KEY ("school administration")) AND PUBYEAR > 1959 AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re")) OR LIMIT-TO (DOCTYPE , "ch") AND (LIMIT-TO (LANGUAGE , "English"))*. Subsequently, the search yielded a total of 5680 publications, which were then sorted according to the highest number of citations.

Data Extraction and Cleaning

The identified publications were exported from the database as comma-separated values (csv) files. The first file comprises of the complete set of 5680 publications generated in the search and the second file has full bibliometric data of the first 2000 entries with the highest number of citations. Two separate files were downloaded due to the restrictions in the Scopus database that allows full bibliometric data of first 2000 entries to be

exported (Moosa & Shareefa, 2020). These first 2000 entries enabled researchers to extract 100 most-cited articles for data analysis.

Before extracting the most-cited publications, data cleaning process was carried out in order to identify incomplete or wrongly entered entries. For data cleaning, field columns were checked to ensure any essential field is not missed, content of the fields are aligned with the field title, and no discrepancy between field title and EDLM content coverage. All the wrongly entered entries were deleted accordingly. After cleaning the data, top 100 publications ordered by citation count were obtained and saved in a different file for data analysis.

Data Analysis

The data analysed for this review consisted of bibliographic information describing characteristics of the 100 most-cited Scopus-indexed documents. This information includes: i) year of publications, ii) number of citations, iii) contributing and collaborating countries, iv) contributing scholars, v) author key words, and vi) contributing journals. Furthermore, total number of publications was provided to enrich the findings.

In this study, citation analysis, co-authorship among countries, co-citation of cited authors, and keyword co-occurrence were analysed using VOSviewer software (van Eck & Waltman, 2014). Additionally, graphs illustrating trend analysis for growth of highly cited documents and geographical distribution of these documents were produced in Microsoft Excel. Among the two types of maps used in bibliometric studies such as distance-based maps and graph-based maps, VOSviewer constructs distance-based maps (van Eck & Waltman, 2010). In keyword co-occurrence analysis, a 'thesaurus file' was created and applied to remove duplicate keywords. In this regard, the keywords "principal" and "principals" were found redundant, thus "principal" was replaced with "principals". Additionally, different thresholds were used in each of the analysis, which are described in the result section.

VOSviewer also provides visualisation of bibliometric networks (van Eck & Waltman, 2014). Nodes and edges in the bibliometric networks are important to interpret the outputs created by the software. According to van Eck and Waltman (2014), a number of points should be considered when referring to nodes and edges: i) size of the circles (nodes) indicates frequency of entities such as number of publications, number of citations, etc; ii) distance between the nodes indicates the relatedness of the nodes (nodes that are closed by are more related); iii) edges indicate relations between two nodes and strength of the relationship; and iv) nodes' colour indicates categories of the nodes. The colours represent group of entities that are closely related to each other (van Eck & Waltman, 2017).

RESULTS AND DISCUSSION

This section describes results of the bibliometric analysis of 100 most-cited publications in field of educational leadership and management. The results are presented in alignment of the five research questions. An interpretation of each analysis is provided along with the respective results.

The Pattern of Publications and Citations

First research question attempts to explore the patterns of publication and citations of the 100 most-cited articles on educational leadership and management (EDLM). Figure 1 depicts distribution of the 100 most-cited articles over the years and normalised average citation of the highly cited articles. The most-cited papers were published between the years 1981 and 2018. Additionally, the figure shows total number of publications on EDLM per year during the time period, showing a publication growth over the years. According to the graph in Figure 1, the number of publications per year remained very few till 1995, and then began to increase in 1996. From 1996 onwards, both highly cited articles and average citation for the highly cited articles (when normalised for the number of years after the publication) started to rise. One of the reasons for this rise should be due to the published critiques (Ahmad Bajunid, 1996; Hallinger, 1995), about the knowledge base and cultural perspectives in educational leadership and administration research. The published critiques probably had increased number of attempts to undertake EDLM research in various contexts.
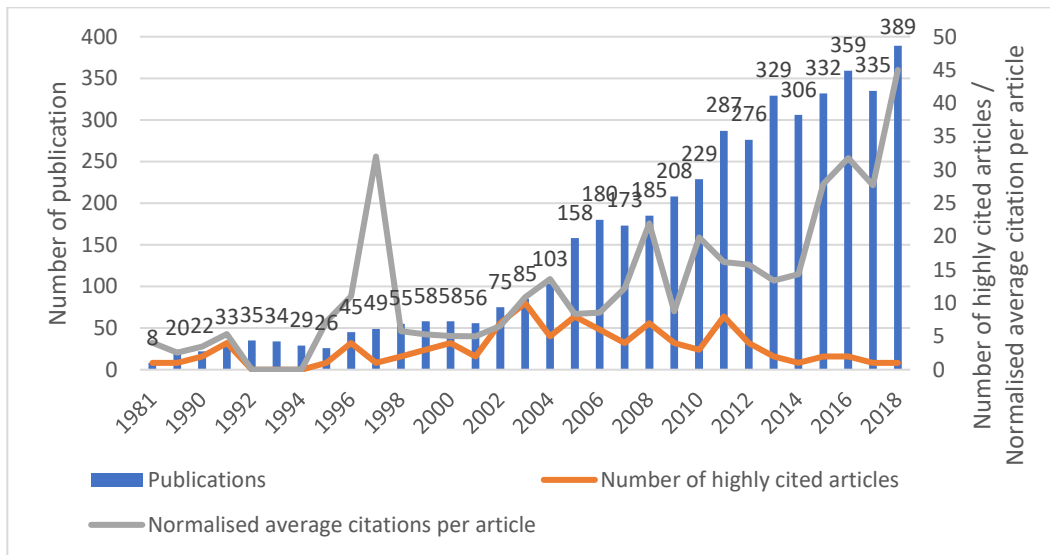

Figure 1: Total number of publications versus number of articles among the 100 most-cited publications

A steady growth of publications was found with the dawn of new millennium. Due to this steady rise, number of highly cited articles had a noticeable upsurge from 2001 to 2003, but experienced fluctuations over years. Although the number of highly cited articles seems to fall after 2011, the normalised average citation of those articles is on a steady rise from 2013 onwards. The average citation of highly cited articles was normalised for the number of years after the publication. Hence, a more obvious reason for the downward slope of highly cited articles published in recent years, is because of the time taken to accumulate citations on those articles. Moreover, the pattern of highly cited articles published from 2003 to 2011, and the growth of total number of publications predict that proportion of highly cited articles would be amplified in the long term. The outcome of the bibliometric analysis indicates that undertaking publications in the field of educational leadership and management is well sustained during the past decades.

Additionally, interest of scholars to publish on this topic is evident, when the line graph for normalised average citation per article is above the number of highly cited articles throughout the years (Moosa & Shareefa, 2020). Therefore, the topic of EDLM is persisted as a trending topic in research and publications based on the highly cited papers published.

International Contributions and Collaborations

First part of the second research question attempts to examine patterns of contributions and collaborations of various countries to the publication of the hundred most-cited articles on EDLM. Out of the 100 most-cited publications in the Scopus data base, country or territory was 'unidentified' for 12 publications. Thus, this analysis was based on the remaining papers among the top 100 publications on the topic of EDLM. Figure 2 shows countries that contributed to the highly cited topmost articles on EDLM. As indicated in the results, 12 countries contributed to the highly cited literature on EDLM and contribution from USA was more significant (49.5%) compared with all other countries. The largest contribution accounted for half of the most-cited scholarly work from USA is followed by United Kingdom with 14.4% (14 articles) and Canada with 13.4% (13 articles). Other noticeable contributors to the most-cited scholarly publications include Netherlands, Hong Kong, and Australia. According to Hallinger and Kovačević (2019), 83% of Scopus-indexed articles on educational administration till 2018 were from four Anglo American societies, namely; United States, United Kingdom, Canada, and Australia. Similarly, this present study on most-cited publications on EDLM shows that 82.5% of articles are from these four Anglo American societies. Additionally, Netherlands, ranked the 4th with 6.2 per cent contribution to the highly cited publications. In sum, the results indicate the dominance of Western countries in highly cited literature on the topic.
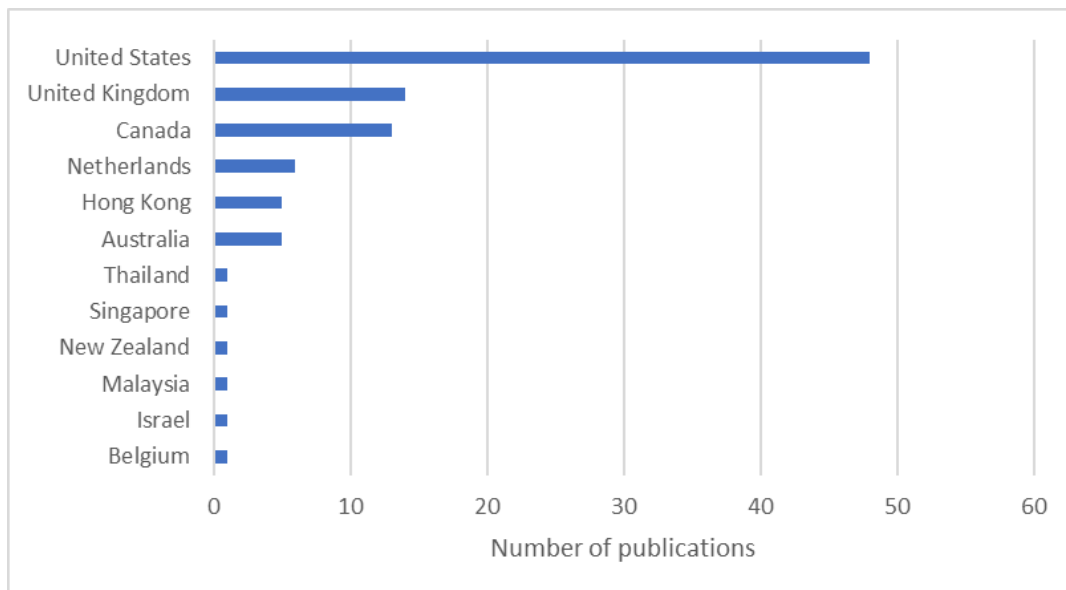

Figure 2: Number of 100 most-cited publications by country

Interestingly, the fact that few countries from Europe, Asia, and Middle East emerged in the list of countries that contributed to the highly cited 100 publications, despite the small quantity of papers, is promising. Each of these countries contributed one publication. A

previous observation also found that "research in developing countries remains relatively limited" (Adams, 2019, p. 1). Among Asian countries, Hong Kong is competing with countries from West and Europe in 'citation league table' on the topic of EDLM. However, none of the publications came from an African country, which is alarming. Having relatively small amount of Scopus-indexed literature on EDLM from Africa and academic study related to EDLM on this continent remains in its nascent stage of development would bring about this outcome (Hallinger, 2019a). Although, some nations outside Anglo-America-European countries are among the international contributors, a small number of publications from each country could be due to the severe imbalance within knowledge base of EDLM (Hallinger & Kovačević, 2019). This outcome suggests that EDLM scholars from international arena, especially outside Anglo-American societies, need to increase visibility of their research publications, using social media networks and promoting via academic sharing networks to get more citations. Additionally, they need to carefully consider reputed and indexed journals to publish in.

Second part of the research question two examines country collaborations to the publications of the 100 most-cited papers on EDLM. VOSviewer was used for analysing country collaborations in Figure 3 which shows that eight countries out of 12 that contributed to the most-cited publications emerged in the collaboration network. With regard to country collaboration, results in the Figure 3 show that United States has collaborated with five countries, representing the maximum collaboration among the countries and with highest link strength of 13. Moreover, three countries: i) United Kingdom, ii) Canada, and iii) Australia, collaborated with same number of countries (number of links = 3); USA in common, and with other two countries. However, Canada becomes the top-two position (link strength = 7), when the strength of collaboration is considered. Whereas, United Kingdom and Australia come to the top-three based on the strength of the links (link strength = 3). Furthermore, Hong Kong and Netherlands connected with two countries, with link strength of 2. Hong Kong is the only country from Asia which collaborated with other countries that contributed to highly cited articles. Two countries from Europe; New Zealand and Belgium, had collaborated with one country. These results indicate the importance of international collaborations between countries in various territories of the world in order to produce highly cited publications on the topic. This study supports evidence from previous observations made by Moosa and Shareefa (2020) in a similar analysis showing positive association between international collaborations and number of highly cited publications.

Figure 3: Country collaboration network based on most-cited publications
Note: *A threshold of 1 was applied for the minimum number of publications by a country. Terms that were not absolute names of the countries were excluded from the analysis. Only 8 countries that emerged in some collaboration are displayed in the network.*

Contributing Scholars and Author Co-Citation Network

Third research question focuses on finding the most contributing scholars and author co-citation network based on the highly cited EDLM publications. Primarily, Table 1 presents top five scholars who have contributed to 100 most-cited articles on EDLM. Total 201 authors contributed to these 100 most-cited publications. However, only five authors were selected, when minimum number of three documents per authors was used as a threshold. Based on the number of most-cited publications, Kenneth Leithwood has contributed highest number of publications (4 articles) with 1529 citations. Thus, he has the highest citation impact among the scholars. The second prominent scholar identified from the analysis is Philip Hallinger who contributed to seven of the selected publications with 1454 citations. Although, Philip Hallinger was at the second rank, total link strength was greater than the link strength of Kenneth Leithwood. This highest total link strength shows that Philip Hallinger has had more collaborations within the scholars who contributed to the most-cited publications on EDLM. To explain further, the link strength specifies the extent of scholarly 'connection' to the work of other scholars who contributed to the Scopus index highly cited publications (Hallinger, 2019a). Next, distinctive author is Doris Jantzi who contributed five articles to the highly cited publications. The following two scholars; Ronald H. Heck and James P. Spillane, each of them contributed three publications to the highly cited articles. These two scholars have substantially higher citation impact than Doris Jantzi, despite having a smaller number of articles. In a nutshell, Kenneth Leithwood has highest contribution and citation impact, while Philip Hallinger has more influence in terms of scholarly 'connection' to the academic work of other scholars based on 100 most-cited publications in Scopus database. Additionally, James P. Spillane has minimal collaboration among the scholars of EDLM despite at fifth rank.

Table 1: *Most contributed scholars to the 100 most-cited publications on EDLM based on Scopus database*

Rank	Scholars	Scopus Articles	Citation	Total Link Strength
1	Leithwood k.	8	1529	19
2	Hallinger p.	7	1454	23
3	Jantzi d.	5	788	13
4	Heck r.h.	3	969	19
5	Spillane j.p.	3	825	0

Next, Figure 4 illustrates author co-citation network/map which visualises similarities or resemblances in the scholarship of EDLM authors based on 100 most-cited articles in the Scopus database. The analysis used threshold of minimum 15 citations of an author, thus 48 authors met the threshold. Each node on author co-citation map representing a different scholar and the node's size reflect the volume of author co-citation (Hallinger, 2020). Additionally, the coloured clusters shown in Figure 4 illuminate discrete schools of thoughts in EDLM within the highly cited publications. When presenting the results of co-citation, it should be noted that scholars who did not associate as authors of the top 100 articles are observable in the co-citation maps, because their work was co-cited with authors of the highly cited papers.
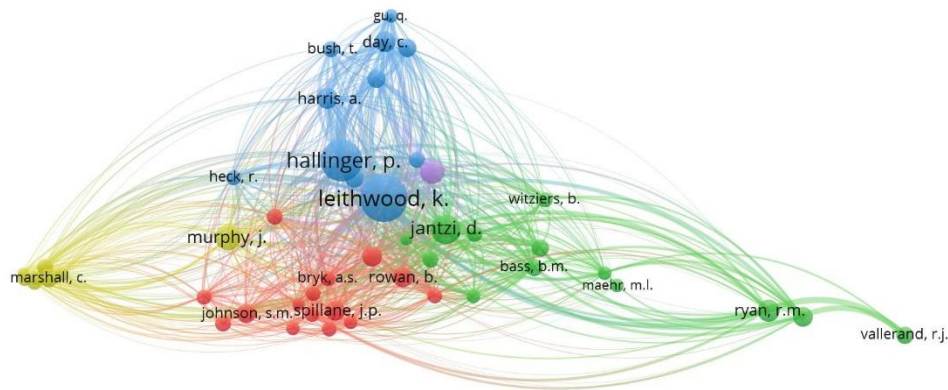
Figure 4: Author co-citation map based on 100 most-cited articles
Note: *Full counting was applied. A threshold of 15 was applied for the minimum number of citations of an author and 48 meets the threshold.*

As shown in Figure 4, the 100 most-cited publications can be categorised into five clusters based on the works cited in these publications. The cluster in purple coulour has one node and very limited edges between other nodes indicating a less prominent cluster. More significant clusters representing authors associated with EDLM scholarship across different areas are blue, red, green and gold. The blue colour cluster consists of scholars whose work was focused on Leadership for learning (eg. Leithwood, Hallinger, Harris, Bush, Heck, Day, Gu). Scholars in this school of thought tend to study how leadership affects learning in schools (Hallinger & Kovačević, 2019). Leithwood and Hallinger lead scholarly work in this cluster and their research works are closely related. As suggested by size and location of nodes representing Leithwood and Hallinger, they have exercised most influence within the publications and in this school of thought, respectively. Interestingly, scholarly work of Leithwood was closely related with work of Jantzi who is in a different cluster (green cluster). This significant result may be due the work of Leithwood that facilitated wider use of transformation leadership in schools (see Leithwood, 1992).

The green colour cluster represents work on transformational and motivational approaches in educational leadership and management. The distance between the nodes in this cluster indicates that scholarships within the cluster are not closely related. Thus, publications at the two ends of the green colour cluster comprised of two groups of scholars with different prominence. Research work of Jantzi and Bass focuses on transformational leadership, while work of Ryan, Deci and Vallerand focuses on self-determination.

The red cluster is associated with shared leadership for organisational improvement. Scholars in this school of thought had various perspectives including: distributed leadership (Spillane and Rowan), school improvement (Bryk), and workplace conditions supporting teachers to contribute to school improvement (Johnson). The gold cluster is concerned with leadership for social justice and school effectiveness. This cluster is in line with one of the thematic strands identified by Tian and Huber (2019) in their bibliometric and content analysis.

Similarly, in green cluster, distance between node of Marshall and node of Murphy are far apart, indicating their works are not much related. Studies of Marshall are primarily inclined to leadership and social justice, and most of the other nodes in the gold cluster are closely related with her node except Murphy's node. Murphy is closest to the red and blue clusters. His works are more towards school effectiveness, and reculturing and redefining leadership. Perhaps, this relatedness with the blue cluster is due to his co-authorship with Hallinger in number of publications (see Hallinger & Murphy, 1985, 1986). Therefore, major four clusters are identified in this co-citation visualisation, namely; i) leadership for learning, ii) transformational and motivational approaches, iii) shared leadership for organisational improvement, and iv) leadership for social justice and school effectiveness.

Key Concepts

Fourth research question attempts to explore the most frequently used key concepts (authors' key words) used in the 100 most-cited articles on EDLM. Identifying commonly studied concepts provide a different perspective on conceptual structure of knowledge base within a respective boundary of data. This investigation was performed by analysing co-occurrence of author keywords in the 100 most-cited articles using VOSviewer. Keyword co-occurrence depicts a keyword co-occurring in two documents (Hallinger, 2020).

Result of this analysis shown in Figure 5 presents most frequently (≥ 2) co-occurring key words in the 100 most-cited publications on EDLM. Among these 25 keywords, 6 keywords had minimum occurrence of 6. The six keywords from highest to lowest frequency were; leadership, school leadership, social justice, transformational leadership, educational leadership, and principals. As indicated in the results, major concepts derived from the keywords can be categorised into seven clusters. These results affirm centrality of topics or key concepts within literature of the top 100 most-cited EDLM publications.

The first co-word cluster in light blue represents role of school leadership for teacher learning. The second cluster in dark blue outlines principals' transformational leadership and leadership theories. The third cluster in green portrays role of educational leadership and administration (namely instructional leadership) for social justice and equity. A recent systematic literature review on leadership for professional learning towards educational equity by Poekert, Swaffield, Demir, and Wright (2020) indicates significance of these concepts in current EDLM research. Hence, undertaking further research on 'leadership for learning' is important for supplementary discoveries in the field (Adams & Md Yusoff, 2019).

The fourth cluster in gold describes importance of leadership and management in implementing educational programs in schools. The fifth cluster in red illustrates teachers at the centre of educational policy and research to bring organisational change. The sixth co-word cluster in purple is located far from other clusters. This cluster represents distributed leadership to develop leadership capacity for school improvement. Both distributed leadership and leadership development are growing areas in the literature of educational leadership and management (Bush & Crawford, 2012; Gumus, Bellibas, Esen, & Gumus, 2016). These co-word clusters provide significant schools of thoughts within the 100 most-cited publications.
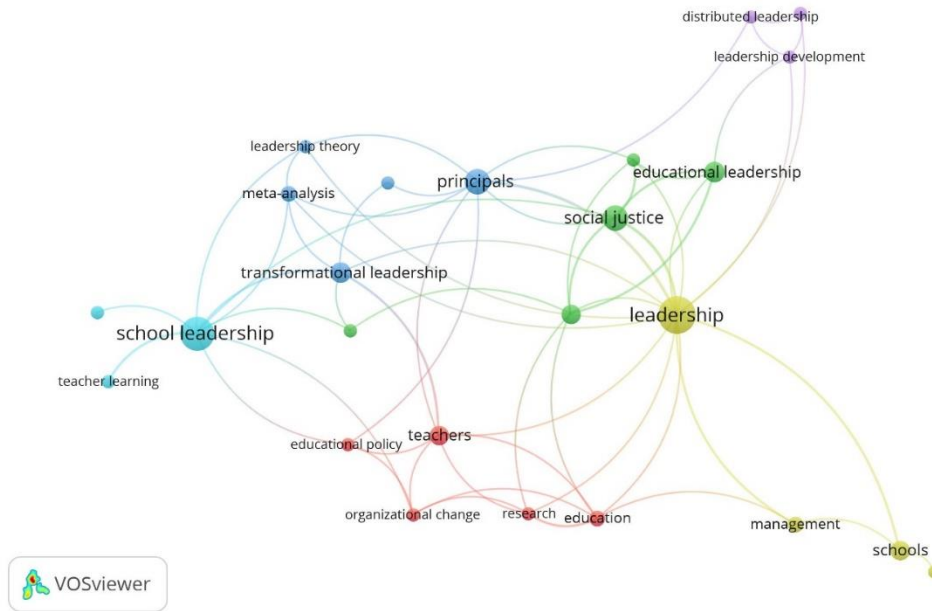
Figure 5: Keyword co-occurrence map based on 100 most-cited publications from EDLM Scopus-indexed articles (for a minimum occurrence of 2, 25 out of the 201 author words met this threshold)

Key Journals

The last research question was intended to examine top journals that have published 100 most-cited articles on EDLM and the characteristics of these journals. The results revealed that a total of 38 journals have published at least one article of the 100 most-cited articles on ELDM. However, top 14 journals that have published at least two or more of those top 100 publications are presented in Table 2. These journals are ranked according to the total number of publications contributed to the top 100 articles in the field.

Table 2: *Top-most journals that published the 100 most-cited publications*

Journal Name	Based on 100 most cited articles			Based on all publications in the journal		
	TP	TC	CPP	CiteScore[a]	SNIP[a]	SJR[b]
Educational Administration Quarterly	29	5640	194	4.8	2.968	2.79, Q1
Journal of Educational Administration	8	762	95	2.5	1.387	0.95, Q1
School Leadership and Management	7	1288	184	1.7	1.212	0.73, Q1
Educational Management Administration & Leadership	5	494	99	4.1	2.536	1.71, Q1
Academic Medicine	4	390	98	5.7	2.417	2.26, Q1

Educational Evaluation and Policy Analysis	4	665	166	5.9	2.765	3.21, Q1
American Educational Research Journal	3	454	151	5.9	4.180	3.22, Q1
International Journal of Leadership in Education	3	340	113	2.5	1.380	0.74, Q1
School Effectiveness and School Improvement	3	470	157	3.3	1.617	1.15, Q1
British Educational Research Journal	2	198	99	3.0	1.687	1.12, Q1
Educational Policy	2	365	183	6.2	3.106	1.90, Q1
Educational Research Review	2	245	123	11.4	6.730	3.22, Q1
Review of Educational Research	2	200	100	21.6	10.745	7.47, Q1
Teachers College Record	2	203	102	_	0.879	0.22, Q3

Note: *TP = Total Publication; TC = Total Citations; CPP = Citation per Publication; SNIP = Source Normalised Impact per Paper; SJR = SCImago Journal Rank; [a]Figures for 2019 provided by SCOPUS; [b]Figures for 2019 provided by SCImago Journal Rank*

The most obvious finding that emerged from the analysis is that all the topmost journals contributing to highly cited articles in the field of EDLM, except one journal in the Table 2, are ranked Q1 by ScimagoJR. Out of the 100 articles, 76 articles were from these 14 journals. This result provides an indication that the most-cited publications on EDLM are from high impact or top ranked journals. One interesting finding is that more than one fourth of publications (29 publications) were from a single journal; *Educational Administration Quarterly (EAQ).* Despite the large volume of publications contributed by EAQ, it has published few articles from emerging regions of Asia, Africa, and Latin America (Hallinger, 2020) and Arab countries (Hallinger & Hammad, 2019), when compared with several other journals in the field of EDLM. Articles published in EAQ does not demonstrate a full comprehensive knowledge base of educational leadership and management research although it is a considered as the most prestigious journal in the area of EDLM (Wang, Bowers, & Fikis, 2017). Thus, it is important to understand the reasons of less publications from emerging regions in the EAQ, despite the highest contributing journal.

In terms of CiteScore and SNIP values in the Table 2, 'Review of Educational Research', and 'Educational Research Review' have highest scores. 'Review of Educational Research' also has the highest SJR value, but the number of contributions to the 100 most-cited publications is lower in the field of EDLM. According to the results, highest CiteScore or SNIP and SJR do not associate with the most dominant journal outlets in the field of EDLM. This result may be explained by the fact that the scope of the journals plays a substantial role in contributing highly cited publications in a specific knowledge base. For example, 'The Leadership Quarterly' is the most dominant journal outlet in the field of leadership development (Vogel, Reichard, Batistič, & Černe, 2020). However, this journal (The Leadership Quarterly) was not involved in the journals that contributed to the 100 most-cited publications on EDLM. A possible explanation for this might be that authors prefer to send high quality papers to journals having publication scope with a specific field of

study. The scope of this journal is not confined to educational or school leadership, rather having broad or general aspects of leadership in its publication scope. It is also observed that CiteScore for 2019 did not appear in 'Teacher College Record'. The result of this may be the discontinuation of this journal from Scopus coverage at different time periods, especially in the year 2017 and 2018. Because, CiteScore 2019 counts citations received in 2016-2019 to definite publications published in the same period. 'Teacher College Record' is also the only low impact (Q3) journal in the top-most contributing journals given in Table 2. Additionally, this journal has a broad scope of educational disciplines, unlike educational leadership and management.

Another important finding was that the top 5 journals in terms of total citations based on 100 most-cited articles are mainly from educational leadership and management. They are: *Educational Administration Quarterly*, *School Leadership and Management*, *Journal of Educational Administration*, and *Educational Management Administration & Leadership*. Unlike these four journals, *Educational Evaluation and Policy Analysis* is a journal that publishes policy-relevant research on topics central to education. Journal of Educational Administration (JEA) being the first international research journal in the field of EDLM (Hallinger, 2020), it is the second top outlet when sorted with total publications based on highly cited 100 articles. However, when re-sorted by total citations based on 100 most-cited articles, the rank of the journal changed to 3rd position. Yet, JEA is one of the key journals in the field.

Limitations and Future Research

Unlike previously published bibliometric reviews on EDLM covering all the publications in different regions of the world, the bibliometric meta data used in this study is limited to 100 most-cited publications in the field of EDLM. Therefore, the results of previous studies that used to science map EDLM knowledge base using entire publications in the field could have been different when compared with findings of this study. Despite this limitation, the study certainly offers thoughtful insights and robust lines of inquiry of knowledge base with the highly cited publications of EDLM.

Another limitation of the current study is the use of a single database (Scopus) to identify bibliometric data. Although other databases such as Web of Science, PubMed, and Dimensions are credible sources, Scopus provides wider coverage of articles required for this bibliometric analysis. It is acknowledged that combination of two or more databases in data extraction would result in somewhat different findings. Furthermore, the scope of this study was limited in terms of language, types of publications, and missing data such as keywords not available in some publications. The selected publications were limited to English language. Moreover, only journal articles, review papers and conference papers were covered in this analysis.

The future research calls for combination of bibliometric analysis and content analysis of the 100 most-cited articles for in depth understanding of these publications. Furthermore, bibliometric analysis can be conducted in future for different schools of thought identified in this study.

CONCLUSION

This study provides an overview of 100 most-cited publications in the field of educational leadership and management that resulted from a bibliometric analysis. The publication patterns of scholarly work show that the highly cited papers were published from 1981 to 2018. Apart from publication growth in the field, normalised average citation per article having upward trend offers a promising future for EDLM research. These top 100 most-cited publications were contributed from 12 different countries. Among them, nearly half of the most-cited scholarly work was contributed from United States, followed by United Kingdom and Canada. Hong Kong stands out from Asia while Thailand, Singapore and Malaysia contributed one article to the topmost publications. Kenneth Leithwood has the highest number of publications and highest citation impact, followed by Philip Hallinger. Though, Philip Hallinger has the highest total link strength indicating his influence within EDLM scholars. With regard to key concepts, significant schools of thoughts were; leadership for teacher learning, principals' transformational leadership practices, role of educational leadership in social justice and equity, importance of leadership and management in implementing educational programs in schools, distributed leadership to develop leadership capacity, and teachers at the centre of educational policy and research to bring organisational change. Findings also revealed that highly ranked journals have more possibility to contribute to the most-cited publications. These results offer important insights into significant and sustainable areas of study within the umbrella of EDLM research.

Based on overall findings of this study, scholars looking forward to conduct research in the field of educational leadership and management need to focus on impactful and trending schools of thoughts. It is because, future of publishing depends on substantial concepts that can influence impending practices of educational leadership and management. Some of the significant schools of thoughts include leadership for professional learning, leadership for social justice, and distributed leadership for leadership development. Researchers must collaborate with EDLM scholars from other countries to increase their citation impact. Additionally, they can also seek out to publish in high impact journals. Furthermore, Asian countries need to find ways to upsurge impact of their research and publications to be stand out within the knowledge base.

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