

*A Bird's-Eye View of Curriculum Publications Concerning Seven Countries:
A Bibliometric Analysis*

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Abstract

This study reports a bibliometric analysis providing a bird's-eye view of publications on curriculum pertaining to Australia, South Africa, Ethiopia, Kenya, Ghana, India and Estonia. Bibliometric analysis enables an overview of the scholarly production within a field. Systematic searches of the Scopus database were conducted to identify relevant peer-reviewed journal articles, and their bibliometric data were extracted. Bibliometric analysis was used to identify how much has been published on curriculum pertaining to the above countries over the past two decades (2000-2021), where such works were conducted, and in which journals they were published. Next, co-occurrence maps of author-defined keywords were created to identify the main topics that are addressed in curriculum publications within the last five years (2017-2021). Results showed that much more research pertains to Australia, South Africa and India compared to the other countries. The number of publications for these three countries increased while those concerning Ethiopia, Ghana, Kenya and Estonia remained low. Most works concerning a given country have been conducted within that country, and much work was conducted within US and UK institutions. The number of journal titles within which the publications appeared is vast. Findings also showed that a great proportion of curriculum publications relate to higher education and the medical field. In addition, topics such as decolonisation and indigenusness appear to be relevant in contemporary educational debate. Potential reasons underlying the findings and implications for moving curriculum research forward will be discussed.

Keywords: Curriculum, Publications, Bibliometric Analysis

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Introduction

This research used bibliometric analysis to provide an overview of the landscape of publications on curriculum concerning the countries Australia, South Africa, Ethiopia, Kenya, Ghana, India and Estonia. These seven countries were selected because they are of interest to the author's institution rather than a specific theoretical rationale. Bibliometric analysis can be defined as 'the quantitative analysis of the bibliometric features of a body of literature' (Hawkins, 2001). Bibliometric features include author names and affiliations, article titles, abstracts, keywords and number of citations. The purpose of such an analysis is to provide an overview of the scholarly production within a given field of study, in this case curriculum scholarship, and to determine the structure of that field. This can help to identify themes and patterns in the literature, changes in production over time or the growth of literature, as well as to find the most prolific authors, institutions, countries and journals within a field. Other uses include the identification of patterns of collaboration amongst scientists as well as the impact of journals (De Bellis, 2009; Garfield, 2006 as cited in Blažun et al., 2012). The results of bibliometric analyses are often visualised in science maps. These are visual representations of the relationships between different bibliometric units such as keywords, author names and journal titles.

This paper first provides a general overview over the past two decades of curriculum publications concerning the seven countries based on the analysis of metadata of peer-reviewed journal articles. Analysing how much has been published, where the work was conducted, and in which journals such work was published can help to identify the key players or research hotspots in the curriculum field. Next, the key topics in publications on curriculum over the past five years were identified based on the analysis of article keywords. This can increase awareness of the important areas of contemporary academic curriculum debates.

The following research questions (RQs) were addressed:

- 1) What is the landscape of curriculum publications concerning the countries Australia, South Africa, Ethiopia, Kenya, Ghana, India and Estonia over the past two decades (2000—2021)?
 - a. How much has been published over time?
 - b. Where has this work primarily been conducted (i.e., What are the most frequent countries of author-affiliation)?
 - c. In which journals have these publications been published most frequently?
- 2) What are the key topics in publications on curriculum pertaining to these countries over the past five years (2017—2021)?

Method

Sample and procedure

The research questions were answered through bibliometric analysis using the free software VOSviewer (Van Eck & Waltman, 2013). To create the dataset, I searched the abstract and citation database Scopus, which is the largest database of its kind. It has a curated collection of peer-reviewed journal articles, which ensures the quality of the included documents. Scopus only includes articles from journals that are published regularly, have a publicly available publication ethics and malpractice statement, and have English language abstracts

and titles. While quality assurance is essential, the inclusion criteria of the database may exclude potentially relevant articles, such as those published in languages other than English. Several searches of the Scopus database were conducted with the following criteria:

- ‘Curriculum’ appears in the article title OR author-defined keywords
- AND ‘[Name of the country]’ appears in the article title OR abstract OR author-defined keywords (note that a separate search was conducted for each of the seven countries)
- AND the documents were published between 2000—2021 (for RQ 1) / AND the documents were published between 2017—2021 (for RQ 2) (note that for RQ 1, one search was conducted for each year and each country separately and another search was conducted for each country including the entire period 2000—2021)
- AND the documents were limited to articles and reviews
- AND the documents were limited to journals.

The search resulted in the document base presented in Table 1.

Country	2000—2021	2017—2021
Australia	1175	427
South Africa	600	286
Ethiopia	45	22
Kenya	90	37
Ghana	53	24
India	384	207
Estonia	37	10

Table 1: Number of documents included in the database per country.

The metadata belonging to these documents were exported as Comma Separated Values (csv) files, which was read and, if necessary, adapted in Microsoft Excel. The data were cleaned to correct mistakes such as incorrect couplings between institutions and countries and incorrect journal titles and author-defined keywords, which were mostly due to formatting issues. In addition, VOSviewer thesaurus files have been created to replace the plural form of keywords with their singular form and to turn American English spelling into British English spelling. This ensured that the same keywords would be recognised as being the same despite their different spelling.

Analysis

Research Question 1

To examine how much has been published on curriculum pertaining to each of the seven countries over the past two decades (RQ 1a), the number of publications for each year and country were entered into Excel. A scatter graph was then created. To identify the most frequent countries within which the works were conducted (RQ 1b), the metadata for publications between 2000—2021 were imported into VOSviewer for each of the seven countries separately. A frequency count for the countries of author-affiliation was obtained by creating co-authorship maps¹. Note that the co-authorship network illustrated in the maps

¹ Such a map visualises the relatedness of different units (authors, organisations or countries), whereby the relatedness of items is determined by their number of co-authored documents.

themselves was not of interest. To identify the most frequent journals within which these publications appeared (RQ 1c), the same metadata was used to create citation maps² in VOSviewer. The maps were used to obtain the frequency count for each journal title.

Research Question 2

To identify the important areas of contemporary academic curriculum debates concerning the seven countries, co-occurrence maps based on author keywords have been created. A keyword co-occurrence map, together with the exact number of occurrences provided within the interactive software, can show the total number of publications within which a keyword occurred as well as the number of publications within which two keywords occurred together. Thus, the analysis can show the most frequently occurring topics, or hot spots, within publications on curriculum.

To create the maps, the following steps were taken within VOSviewer for each country:

- Importing the csv file containing the metadata for publications between 2017-2021 as well as the thesaurus files into VOSviewer.
- Selecting *Co-occurrence* as the type of analysis and *Author keywords* as the unit of analysis using the *full counting method*. The full counting method means that each co-occurrence link between two keywords has the same weight.
- Selecting the minimum number of occurrences of a keyword. That is, determining in how many publications a given keyword needs to appear at least (i.e., the threshold) in order to be included in the map. Note that this number differed between countries as using the same threshold for countries with very different numbers of publications leads to either a) a selection of too many keywords and thus illegible maps (for those with large numbers of publications) or b) very few or even no selection of keywords (for those with very small numbers of publications). The selected threshold will be made explicit in the results.
- Selecting the number of keywords that will be presented in the map. Here, the total number of remaining keywords was selected for each map.

Results and Discussion

Research question 1

This report first sought to examine how much has been published on curriculum pertaining to Australia, South Africa, Ethiopia, Kenya, Ghana, India and Estonia over the past two decades. Figure 1 depicts the number of publications between 2000—2021 for each of the seven countries (also see Table 1). It becomes immediately clear that the research output differs vastly between countries. Publications concerning Australia are most frequent, followed by South Africa and India. The numbers of publications concerning Ethiopia, Kenya, Ghana and Estonia are small and relatively stable over time. In contrast, there is an increase in publications pertaining to Australia (from 9 to 114), South Africa (from 3 to 75), and India (from 2 to 70) over time.

² Such a map visualises the relatedness of different units (documents, sources, authors, organisations or countries), whereby the relatedness of items is determined by the number of times they cite each other.

It would have been plausible that publications on curriculum spike in times of curriculum reform when the interest in curriculum matters might be the strongest. However, the current analysis does not indicate such trends. There are no notable spikes in publications, except perhaps for South Africa in 2014 (n = 58). This coincides with the year in which the new National Curriculum Statements were implemented in the Senior Phase and Grade 12. However, there were no spikes in years when they were implemented in other stages of Education, such as the intermediate phase and Grade 11 in 2013. This suggests that this was a coincidence rather than that the number of publications increased because of the implementation. The steady growth of publications, at least for some of the countries, is in line with the general global trend of increased numbers of publication over time. The numbers of publications referenced in Scopus are generally increasing over time (Johnson et al., 2018). Hence, the increase in curriculum publications may not reflect an increase in interest for the field specifically.

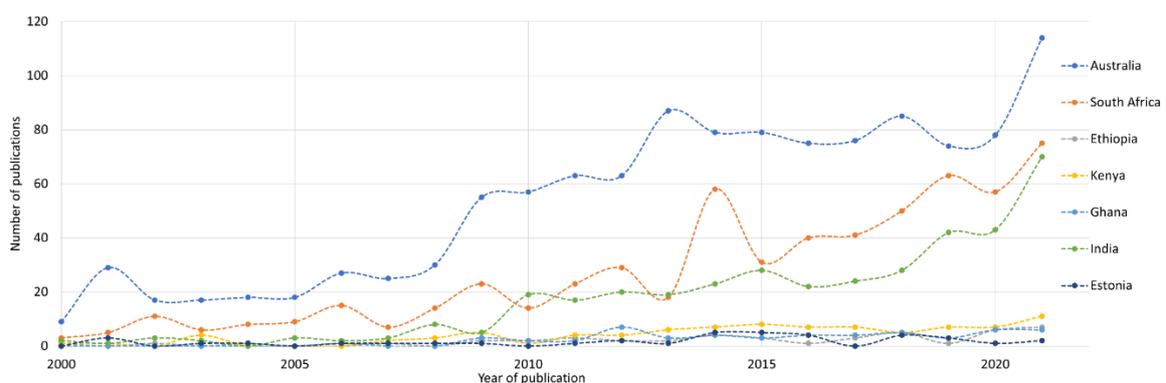


Figure 1: The number of publications on curriculum between 2000—2021 by country.

Why might the number of publications vary considerably between countries? Rather than assuming that these trends reflect differences in curriculum interest, it seems plausible that differences in resources for research into curriculum matters might explain the findings. Research productivity in terms of number of publications is linked to the wealth of a country (Jaffe et al., 2020). Here it becomes important to look at the countries within which the work was conducted. Table 2 provides this overview. It is clear, and unsurprising, that most authors are affiliated with institutions within the countries that the publications pertain to. These countries differ in their GDP per capita (in current US dollars) as well as their research and development expenditure (in % of GDP; The World Bank, 2022). In 2020, the GDP per capita was highest in Australia (51,692.8), followed by Estonia (23,027.0), South Africa (5,655.9), Ghana (2,205.5), India (1,927.7), Kenya (1,878.6) and Ethiopia (936.3). A similar picture is painted by their research and development expenditure, which is highest in Australia (1.87 as of 2017), followed by Estonia (1.40 as of 2018), South Africa (0.83 as of 2017), Kenya (0.79 as of 2010), India (0.65 as of 2018), Ghana (0.38 as of 2010) and Ethiopia (0.27 as of 2017). Countries with less resources tend to publish less. Hence, it seems particularly relevant to invest into curriculum research in countries that have less resources in order to support the development of successful curricula. Another potentially more cost-effective approach could be to invest into the development of international curricula that can be adapted to different nations or contexts (for example see the Cambridge international curriculum³ and Fitzsimons et al., 2020).

³ See <https://www.cambridgeinternational.org/why-choose-us/benefits-of-a-cambridge-education/international-curriculum/>

Interestingly, the number of publications for India and Estonia do not seem to follow the pattern whereby the number of publications is linked to resources as publications are fewer than one might expect for Estonia and higher for India. One possible explanation for this unexpected pattern could be the language of publication as Scopus only features journals that have an English title and abstract. The countries within which most of the included publications are conducted (Australia, South Africa and India) are also those that have English as one of their national languages. Accordingly, results might be biased towards countries where more publications are in the English language.

	1	2	3	4	5
Australia	Australia (1017)	UK (76)	New Zealand (57)	US (56)	Canada (36)
South Africa	South Africa (526)	US (39)	UK (27)	Australia (24)	Canada (9)
Ethiopia	Ethiopia (29)	US (8)	UK (5)	Canada (4)	South Africa (3)
Kenya	Kenya (54)	US (34)	South Africa (11)	UK (5)	Canada (4)
Ghana	Ghana (37)	US (10)	Netherlands (8)	South Africa (5)	UK (4)
India	India (294)	US (58)	UK (16)	Australia (13)	Canada (9)
Estonia	Estonia (27)	Finland (6)	Denmark (2), Germany (2), Italy (2), Sweden (2)		

Table 2: Top 5 countries of author-affiliations for publications by country (2000—2021).

Note. Numbers in parentheses indicate the number of publications with a given country of author-affiliation. US = United States, UK = United Kingdom.

As already mentioned, most authors of curriculum publications pertaining to a given country are affiliated with institutions within that country. But the number of countries of author-affiliations also show that such works are conducted across the globe. Publications concerning India had 55 different countries of author-affiliation, followed by South Africa (53), Australia (50), Kenya (32), Ethiopia (24), Estonia (20) and Ghana (19). Collaborations within the curriculum field thus reach across the world.

It also becomes clear that there are some ‘key players’ in the field, that is, countries within which a lot of work is produced which does not directly concern the country itself. The United States and the United Kingdom appear most frequently in the Top 5. In fact, they are amongst the Top 5 countries of author-affiliations of each country except for Estonia. Reasons for why the USA and UK appear frequently in the Top 5 presumably include that they have a relatively high GDP per capita as well as research and development expenditure (41,059.20 and 1.7 for the UK; 63,593.40 and 2.83 for the USA, respectively) (The World Bank 2022a, 2022b). The USA rank 12th and the UK 30th for GDP per capita in the world. In addition, publications from these countries are likely to have English language titles and abstracts and are thus more likely to be included in Scopus. The same is true for Australia, which also appears relatively frequently in the Top 5 for publications, specifically for Australia, South Africa and India. Another reason might be that many universities in the USA and UK belong to the best in the world, which presumably produce more and higher quality publications, relatively speaking. Just under half of the top 100 universities in the world are in the USA (with 26 universities) or the UK (18) (Quacquarelli Symonds, 2022). The fact that the USA and UK do not seem to publish as frequently on curriculum concerning Estonia

might be another reason for the relatively low number of curriculum publications for that country. This lack of involvement seems particularly interesting because Estonia is a high performing country.

Moving on RQ 1c, the Top 5 journal outlets within which the publications appear are presented in Table 3. Similar to the number of countries of author-affiliation, the numbers of different journal titles publishing these works are high. Curriculum publications concerning Australia appeared in 514 different journals, followed by South Africa (307), India (267), Kenya (68), Ghana (47), Ethiopia (37) and Estonia (29).

	1	2	3	4	5
Australia	Curriculum Perspectives (32)	Nurse Education Today (21)	Curriculum Journal (20)	Australian Journal of Teacher Education (16)	Journal of Curriculum Studies (15)
South Africa	Mediterranean Journal of Social Sciences (31)	African Journal of Research in Mathematics, Science and Technology Education (30)	South African Journal of Education (22)	Perspectives in Education (20)	Education as Change (16)
Ethiopia	BMC Medical Education (4)	International Information and Library Review (3), International Journal of Educational Development (3)		Mediterranean Journal of Social Sciences (2)	various
Kenya	Educational Research and Reviews (7)	International Journal of Educational Development (6)		various	
Ghana	BMC Medical Education (3)	Accounting Education (2), Curriculum Inquiry (2), Journal of Curriculum Studies (2), Nurse Education in Practice (2), Sage Open (2)			
India	Journal of Clinical and Diagnostic Research (12)	Journal of Engineering Education Transformations (10)	Indian Journal of Physiology and Pharmacology (9)	Indian Journal of Pharmacology (7)	Medical Journal Armed Forces India (6)
Estonia	Journal of Curriculum Studies (5)	Early Child Development and Care (3)	Education 3-13 (2), Estonian Papers in Applied Linguistics (2)		

Table 3: Top 5 journals within which publications on curriculum appear (2000—2021).

Note. Numbers in parentheses indicate how many publications appeared in a given journal.

The Top 5 journal titles for the selected countries suggest that these focus on three main topic areas: *curriculum* (e.g., Curriculum Perspectives, Journal of Curriculum Studies, Curriculum Inquiry), *medicine/pharmacology/nursing* (e.g., BMC Medical Education, Nurse Education Today, Indian Journal of Pharmacology) and *education* (e.g., Educational Research and Reviews, Perspectives in Education). There is no particular journal that immediately stands out across countries but there are a few journals that appear in the Top 5 of more than one country. These are the Journal of Curriculum Studies (Estonia, Australia and Ghana), the

International Journal of Educational Development (Ethiopia and Kenya) and BMC Medical Education (Ghana and Ethiopia).

Research question 2

This next section presents findings for the question of what is being published on curriculum concerning Australia, South Africa, Ethiopia, Kenya, Ghana, India and Estonia over the past five years (2017—2021). This can help to identify important areas of contemporary curriculum debate.

The figures below show the keyword co-occurrence maps for the seven countries of interest. As explained in the VOSviewer manual, the size of the nodes and words depend on the number of occurrences of a keyword – the greater the number of occurrences, the larger the size. The distance between two nodes represents the strengths of their relationship – the shorter the distance, the stronger the relationship. This is also reflected in the lines connecting two nodes – the thicker the line, the stronger the relationship. The strength of a relationship is based on the number of co-occurrences. VOSviewer automatically forms clusters, which are sets of closely related nodes. These clusters are represented by colours. Each keyword can only belong to one cluster but does not have to belong to any cluster at all. Note that some nodes may not be labelled when saving an image of the maps but that these can be viewed in the interactive map within the software.

Australia

The publication sample for Australia included 427 journal articles, which contained a total of 1314 author-defined keywords after cleaning. The threshold of occurrence was set to 5, which was met by 40 keywords. These are depicted in Figure 2. The keywords that occurred most frequently next to *curriculum* (n=184) and *Australia* (n=46), are *education* (n=45), *pedagogy* (n=21) and *higher education* (n=19). It can thus be said that pedagogy and higher education are frequent topics of interest in curriculum research pertaining to Australia. There are six clusters. The largest cluster in terms of the number of included keywords (in red) contains 11 keywords such as *health and physical education*, *teacher education*, *policy* and *inclusive education*. The map shows that topics related to the medical domain, including nursing and dentistry, are particularly prevalent.

Examining the map together with the metadata obtained from Scopus points towards an important caveat of using bibliometric analysis which is important to be aware of when interpreting the maps. Namely, VOSviewer only counts identical keywords together which can result in misleading conclusions. For example, the keyword *assessment* occurs only seven times in the map. Based on this low number, one might assume that assessment does not play an overly important role in curriculum publications in Australia. However, a closer examination of the actual keywords within the excel file exported from Scopus shows that this conclusion would be misleading. In fact, ‘assessment’ appeared in 18 publications but because of variations of keywords, not all instances were counted together. Examples include the keywords *formative assessment*, *assessment for learning*, and *assessment moderation*. Thus, assessment was a more important topic in curriculum publications than the map suggests. The same is true for the topic of ‘indigenous’, which appeared 8 times in the map. When examining all keywords in the metadata, there are 29 instances of ‘indigenous’, making it one of the most important keywords. Keywords include *indigenous health*, *indigenous perspectives*, *indigenous knowledge* and *indigenous control*.

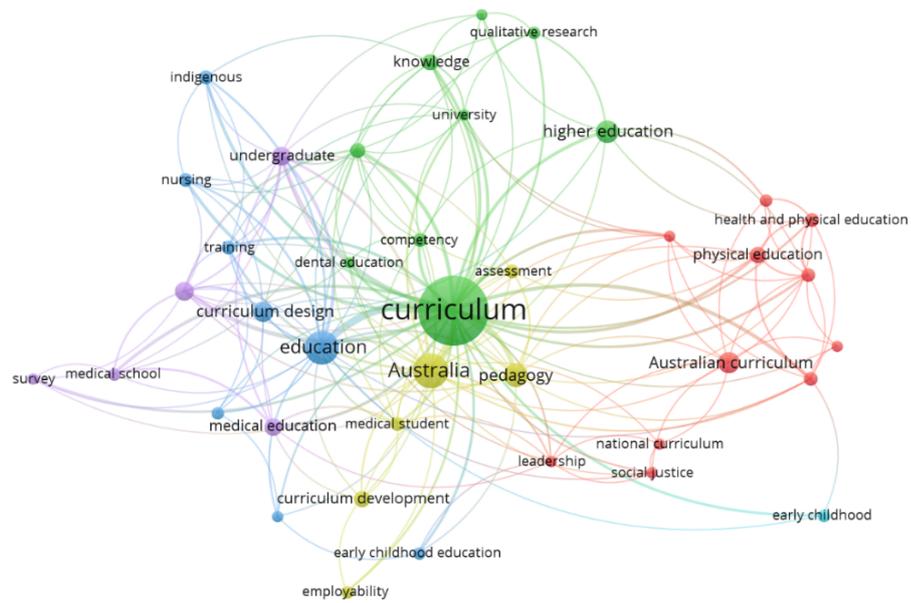


Figure 2: Keyword co-occurrence map of curriculum publications pertaining to Australia between 2017—2021.

South Africa

The publication sample for South Africa included 286 journal articles, which contained a total of 1029 author-defined keywords. The threshold of occurrence was set to 5, which was met by 25 keywords. These are depicted in Figure 3. Keywords that occurred most frequently next to *curriculum* (n=95) and *South Africa* (n=51) are *decolonisation* (n=33), *curriculum development* (n=19), *education* (n=17) and *higher education* (n=17). Thus, similar to Australia, many publications appear to focus on higher education. Decolonisation seems to play a central role as does the topic of indigenesness. The keywords form five clusters. The largest cluster (in red) includes keywords such as *culture*, *diversity*, *entrepreneurship education*, *policy* and *indigenous knowledge*.

There are interesting differences between topics pertaining to Australia and South Africa. For instance, the keyword *entrepreneurship* does not appear at all in publications concerning Australia. One reason why this seems to be a topic of interest in South Africa might be the severe problem of unemployment. South Africa has one of the highest rates of unemployment worldwide, and *entrepreneurship* has been proposed as one way to tackling this problem (see Du Toit, 2020). Another difference to Australia is that the medical field does not seem to play as important a role.

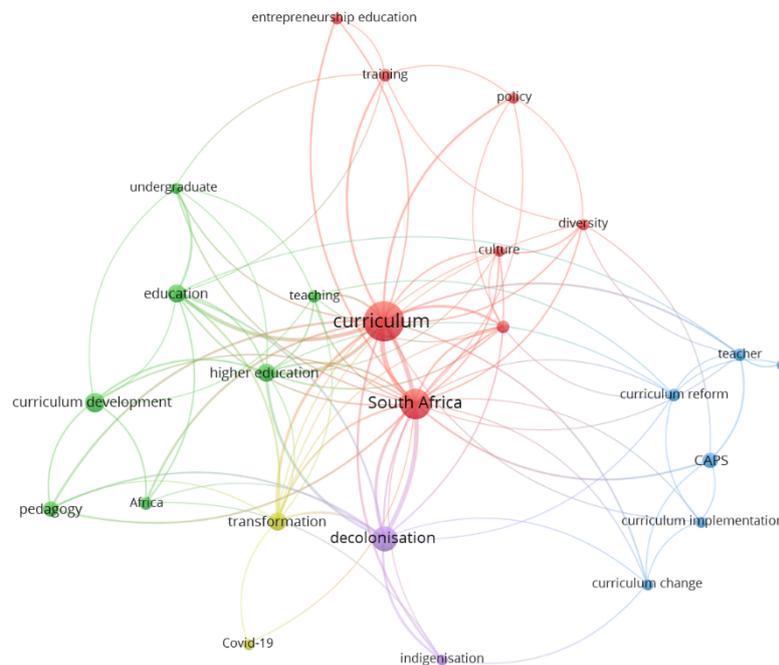


Figure 3: Keyword co-occurrence map of curriculum publications pertaining to South Africa between 2017—2021. CAPS = Curriculum and Assessment Policy Statement.

India

There were 207 articles in the sample of publications concerning India. These had a total of 706 author-defined keywords. The threshold of occurrence was set to 5, and the remaining 15 keywords are included in the co-occurrence map presented in Figure 4. The most frequently occurring keywords next to *curriculum* (n=73) and *India* (n=24) are *medical education* (n=14), *curriculum development* (n=10) and *education* (n=8). Note again that occurrences of *curriculum* would be much higher if multiple-word keywords containing ‘curriculum’ would be counted together. The fact that medical education is one of the most prominent topics is not surprising given that four of the Top 5 journals for India are from the medical field (see Table 3). Medical education in India is a highly important topic as the availability of health workers is much below recommendations by the World Health Organisation (see Sabde et al., 2020). Interest might also be high as the National Medical Commission Bill was introduced in 2019 in order to improve the medical education system. Keywords in the map form four clusters. The medical cluster (in green) contains keywords such as *medical curriculum*, *medical students* and *knowledge*. Note that *knowledge* is linked to keywords across the map, such as *teaching* and *curriculum development*. The largest cluster (in red) shows again that higher education seems to be heavily featured in publications on curriculum.

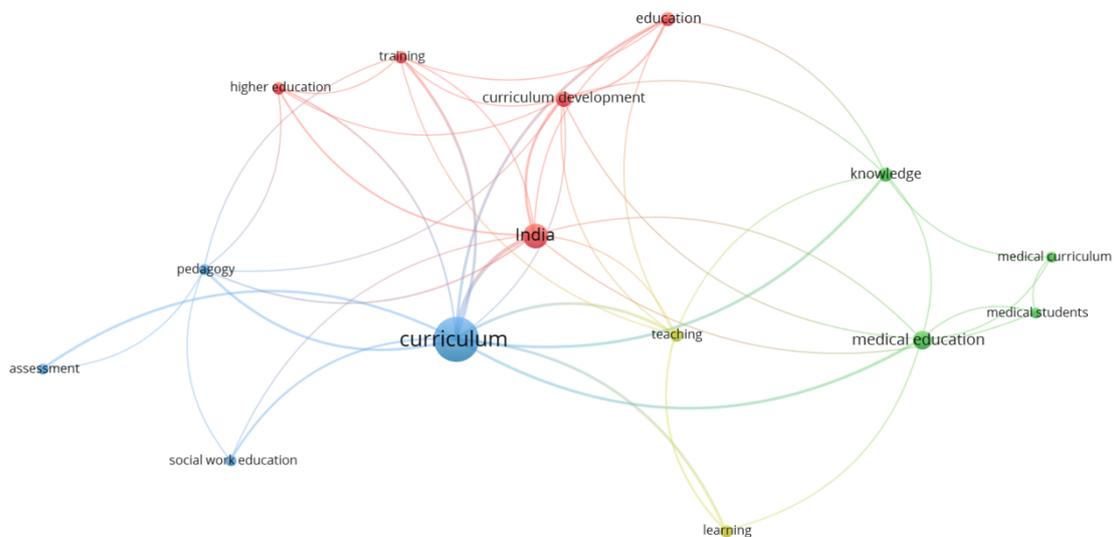


Figure 4: Keyword co-occurrence map of curriculum publications pertaining to India between 2017—2021.

Ethiopia, Kenya, Ghana and Estonia

The keyword analyses for curriculum publications concerning Ethiopia, Kenya, Ghana and Estonia are presented together given the scarcity of publications and, thus, keywords. The small number of publications and reoccurring keywords make it difficult, if not impossible, to identify important patterns or topics. There are only 22 journal articles in the sample for Ethiopia, and within these only 97 keywords appeared. Accordingly, the keyword co-occurrence map presented in Figure 5 looks very sparse. The threshold for the map has been set to merely 2, which was met by seven keywords. As shown in the map, these are *curriculum* (n=9), *Ethiopia* (n=6), *Africa* (n=3), and then *competency*, *education*, *medical education*, and *training*, which all occurred in two publications. All other keywords within publications appeared only once.

Similarly, the sample for Kenya included only 37 journal articles, which featured 153 keywords. Of these keywords, only three appeared in five or more publications, which is why I set the threshold to 2. The 10 keywords that met the threshold are depicted in Figure 6. The most frequent keywords were *curriculum* (n=14), *Kenya* (n=7) and *education* (n=5). All other keywords included in the map appeared in two publications alone. *Curriculum*, *Kenya*, and *education* are very general areas that do not indicate specific topics of current debate, and keywords that occurred only twice in publications over the past five years hardly indicate matters of special relevance.

There were 24 curriculum publications concerning Ghana, which included 97 keywords. The threshold for the co-occurrence map was set to 2, and the remaining six keywords are depicted in Figure 7. All keywords in the map except for *Ghana* (n=9) and *curriculum* (n=6) appeared only twice.

The curriculum publication landscape for Estonia looks even scarcer. There were a mere 10 publications within the sample, which featured only 47 keywords. The only keywords that

occurred more than once were *curriculum* (n=3), *Estonia* (n=2) and *curriculum development* (n=2). None of these keywords co-occurred within the same publication. Hence, no co-occurrence map is presented here.

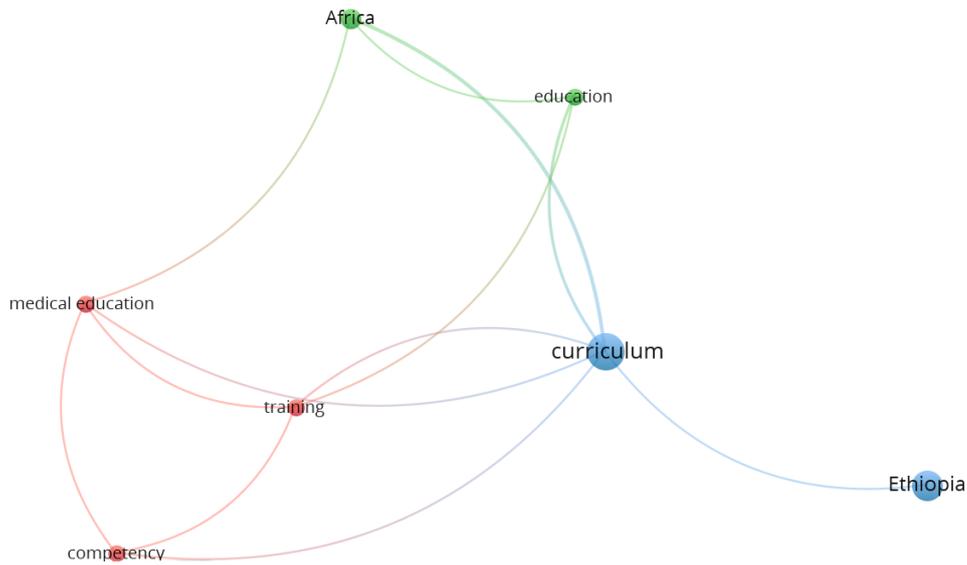


Figure 5: Keyword co-occurrence map of curriculum publications pertaining to Ethiopia between 2017—2021.



Figure 6: Keyword co-occurrence map of curriculum publications pertaining to Kenya between 2017—2021.

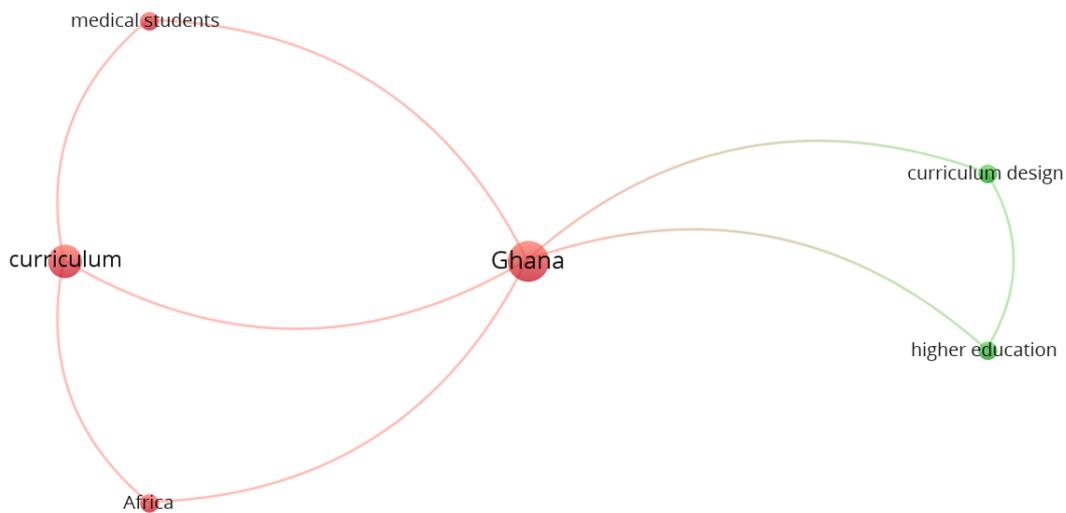


Figure 7: Keyword co-occurrence map of curriculum publications pertaining to Ghana between 2017—2021.

Limitations

Bibliometric analysis aims to provide an overview of a given research field rather than deep insights, and the analyses using VOSviewer enabled such an overview. Yet, there are also important limitations that need to be kept in mind. The current analysis showed that relying solely on the tool without examining the publications more closely can lead to misleading conclusions. Specifically, the fact that VOSviewer only counts keywords together which are identical can lead to the underrepresentation of important areas. In addition, the output of course crucially depends on the input. The selected database determines which works are included. Research that is not published in English might be excluded as well as research published in outlets other than peer-reviewed journals, including books and dissertations. It can thus not necessarily be claimed that all relevant works are captured.

Conclusion

This report provided a bird’s-eye view of curriculum publications concerning seven countries. It found that there is much more research pertaining to Australia, South Africa and India compared to the other countries overall as well as across time. There was an increase of publications over time for these three countries while the number of publications concerning Ethiopia, Ghana, Kenya and Estonia remained low. Based on the country of author-affiliation, most publications concerning a given country have also been conducted within that country, which is why differences in research resources may explain variations in publication rates. In addition, the typical language of publication is likely to affect which journal articles have been included in the database, with those published in a language other than English being excluded. Hence, publications in countries where English is a national

language presumably had a higher chance of being included. To gain a more comprehensive view over curriculum publications, other sources than Scopus may thus need to be considered. The number of journal titles within which the curriculum publications appeared is vast, and no particular journal stood out as the most important one. This report also found that publications related to higher education and the medical field are especially frequent. In addition, topics such as decolonisation and indigenusness seem very relevant.

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