**VOSviewer**

**Keywords map**

VOSviewer\(^1\) is a tool, created by the Centre for Science and Technology Studies (CWTS) of Leiden University. This tool can be used to create and visualize bibliometric networks. These visualizations are often called maps.

You can create a network, based on the references in a list of publications: which publications/journals/authors are co-cited? Or which publications/journals/authors are related because they share a number of references?

In this exercise you get to know a different application of VOSviewer: you will create a map based on the author keywords — the keywords given by the authors. You can use the map to find additional search terms or to limit the scope of your topic. In this exercise we start with a search in Scopus, but you can also use data downloaded from Web of Science or PubMed. Other databases might be used as well, as long as you can export data in RIS-format and the file contains keyword-data.

![Keywords Map](image)

An example of a co-occurrence map for author keywords. Scopus was used to collect publications on the topic of mindfulness. Our goal was to get an overview of the keywords authors used and we hoped to identify subtopics. The term mindfulness had to appear in the title, keywords or in the abstract, we selected only English reviews (1382 records in total). 2407 keywords were identified by VOSviewer, we selected a threshold of 4 occurrences, which left 236 keywords. This map revealed terms previously unknown to us such as mbrr and mbct (not visible in this screenshot).

\(^1\) VOS stands for ‘visualization of similarities’. This handout is based on VOSviewer version 1.6.10.
Collecting the data in Scopus

1. Perform a search in Scopus – this can be a general search, you don’t have to be too specific.
2. You can export up to 2,000 results from Scopus. If you have more results, you can add a search term or use the filters on the left side of the screen (for example, publications from the last 10 years, only articles).
3. Select all results (this options is hidden under the arrow next to Export)

![Export options in Scopus]

4. Choose Export > mark CSV (Excel) > and select all options under What information do you want to export?
5. Download the CSV file and save it on the desktop of your computer (this makes it easier to find when you want to upload it to VOSviewer). Downloading the file can take some time (due to the size, several MB).
6. If you have more than 1 set, you don’t have to combine them – VOSviewer will do this for you.

VOSviewer

2. You can download the program or open it directly from the website. Here we use the second option: click Launch VOSviewer. Follow the directions on the screen. If you get a JAVA-warning, select ‘Later’. VOSviewer opens with a big blank screen.
3. Click Create on the left side of the screen.
4. Choose the option in the middle: Create a map based on bibliographic data. Click Next.

VOSviewer will lead you through a number of steps. We advise you to write down your choices – that will help to recreate or improve a map later.

5. Choose data source: Choose Read data from bibliographic database files. Click Next.
6. Select File: Open the tab Scopus and browse to the downloaded CSV file. Click Next. Reading the file can take some time.
7. **Choose type of analysis and counting method:** Choose as 'type of analysis' Co-occurrence, as 'unit of analysis' Author Keywords and as 'counting method' Full counting (this means that every keyword counts has the same weight, regardless of the number of keywords given to a particular article). We don’t have a thesaurus file yet, you can leave that option empty. Click **Next**.

8. **Choose threshold:** How many times does a keyword have to occur in your dataset to be used in the analysis? When you change the number of occurrences, the number of keywords in the row will change accordingly. Make a choice, write it down and click **Next**.

9. **Choose number of keywords:** for all keywords a total strength of the co-occurrence links with other keywords will be calculated. In this step you enter the number of keywords you want to see in your map – the keywords with the strongest links will be shown in your map. Adjust the number at ‘Number of keywords to be selected’, write down your choice and click **Next**.

10. **Verify selected keywords:** the list of keywords is generated. You can scroll through the list and unmark terms. Click **Finish**.

11. In some cases, you will get a pop-up ‘Unconnected Items’. Some items in the network are not connected to each other. If you want only to show the connected items, click **Yes**.

12. The map is created.
How to read the map

- The bigger a circle, the more frequently the keyword appears in the publication set from Scopus.
  **Check:** Do you see surprising or new keywords in your map? They can be terms you can add to your own search terms.

- The keywords are assigned to a cluster, based on a computer algorithm. The first 18 clusters have their own colour, the other clusters are grey. When the colours are mixed, the algorithm couldn’t make clear distinctions between the clusters.
  **Check:** Can you distinguish clusters in your map? Do they make sense? Can this help you focus your research question?

- By adding lines, you can see the relation between two keywords: how often do they appear together? You can adjust the number of lines on the right side of the screen. When you scroll over a term, you’ll see the links with other keywords.

**Tips for VOSviewer**

- In the map you will often see terms in singular and plural form or with/without a hyphen (-), etc. You can merge these keywords by using a thesaurus file (in the step Choose type of analysis and counting method). Create a two-column table in Excel. Name the first column *label* and list the keywords you want to delete. Name the second column *replace by* and enter the replacement keywords. If you leave the cell in the column `replace by` empty, the keyword in the column `label` will be removed.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>label</td>
<td>replace by</td>
</tr>
<tr>
<td>2</td>
<td>cyber-bullying</td>
<td>cyberbullying</td>
</tr>
<tr>
<td>3</td>
<td>cyber-bullying</td>
<td>cyberbullying</td>
</tr>
<tr>
<td>4</td>
<td>bystander</td>
<td>bystanders</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Save this file as a text file (tab delimited). You can upload the file in the step ‘Choose type of analysis and counting method’.

- If you want to save a picture of the map, click **Screenshot** on the left side of the screen and choose **Save to File**.
- You can adjust the clustering: under Analysis > Clustering the default clustering resolution is 1.00. When you enlarge the resolution (for example 1.20), you get more clusters. With a smaller value, you get less clusters.
- You can see the keywords under the tab Items.
- Click Save to download the list of keywords in the map.

**Want to try more?**

- Create a citation map on the journal or author level: Which journals or authors within your set of publications cite each other?

**Questions?**

- Please contact the University Library via skill.library@eur.nl. You can also contact us if you want to know how to use data from another database as input in VOSviewer.