

bibliometrix 操作說明

賴慧敏、張仁誠

目錄

一、資料檢索.....	2
二、安裝軟體.....	7
三、Bibliometrix 載入資料.....	10
四、Bibliometrix 產生的圖表.....	17
五、評分者信度 kappa	27

一、資料檢索

***不管在 WOS 或 SCOPUS 擷取資料時都要用英文介面

1. 開啓學校的圖書館資料庫資源，選取 Web of Science(WOS)--SCIE & SSCI [引用文獻索引 web 版]

← → ↻ 不安全 | library.nctu.edu.tw/database/search/DatabasesList.asp?Keyword=WOS&Submit=Search

國立臺中科技大學 圖書館 LIBRARY

資料庫名稱或學科範圍中含： WOS 字串 共 2 筆 Database Sea

資料庫名稱	類型	內容簡介
Web of Science(WOS)--A&HCI	書目型	【臺灣學術電子資源永續發展計畫購置】 Web of KnowledgeSM強化了Web of Science，使Web of Science的功能與其Web of Knowledge是一個功能強大的網路平台、研究導向的人口網站、同時也提供了網站全文、並連結分析與評量導向工具的完整解決方案。Web of Knowledge開Arts & Humanities CitationIndex(A&HCI)藝術與人文引文索引資料庫，包含1,8C的期刊資訊。內容提供2011年至今年最新資料(10年回溯)，每週五天更新。 收錄年代： 2011~current
Web of Science(WOS)--SCIE & SSCI [引用文獻索引 web 版]	書目型	【臺灣學術電子資源永續發展計畫購置】 Web of KnowledgeSM強化了Web of Science，使Web of Science的功能與其Web of Knowledge是一個功能強大的網路平台、研究導向的人口網站、同時也提供了網站全文、並連結分析與評量導向工具的完整解決方案。Web of Knowledge開Science Citation Index Expanded(SCIE)自然科學引文索引資料庫8,300種以上；(SSCI)社會科學引文索引資料庫8,800種以上之期刊，內容提供2009年至今年最 收錄年代： 2009~current

2. 登入之後，點選 Advanced Search(進階檢索)，輸入要搜尋的條件，例如，可以選擇 Topic(主題)，在右側輸入 robot，然後按下右側的 add to query(新增查詢條件)。可以設定多個，只要一個一個設定後，下方的 Query preview(查詢條件預覽)就可以看到目前的設定條件了。

www.webofscience-com.nctu.idm.oclc.org/wos/woscc/advanced-search

DOCUMENTS RESEARCHERS

Search in: Web of Science Core Collection Editions: All

Add terms to the query preview

Topic robot Add to query

More options

Query Preview

Enter or edit your query here. You can also combine previous searches e.g. #5 AND #2

+ Add date range Clear Search

Booleans: AND, OR, NOT Examples

Field Tags:

- TS=Topic
- TI=Title
- AB=Abstract
- AU=Author
- AI=Author Identifiers
- AK=Author Keywords
- GP=[Group Author]
- ED=Editor
- KP=Keyword Plus*
- SO=[Publication Titles]
- DO=DOI
- PY=Year Published
- CF=Conference
- AD=Address
- OG=[Affiliation]
- OO=Organization
- SG=Suborganization
- SA=Street Address
- CI=City
- PS=Province/State
- CU=Country/Region
- ZP=Zip/Postal Code
- FO=Funding Agency
- FG=Grant Number
- FD=Funding Details
- FT=Funding Text
- SU=Research Area
- WC=Web of Science Categories
- IS=ISSN/ISBN
- UT=Accession Number
- PMID=PubMed ID
- DOP=Publication Date
- LD=Index Date
- PUBL=Publisher
- ALL=All Fields
- FPY=Final publication year
- SDG=Sustainable Development Goals

以下已經依序設定好符合 robot, robotic, programming education, computational thinking 的主題了，再設定文章發表的時間 2006-2022。再設定文章型態為 Article OR Review

下圖設定文章的發表語言限定為 English

下方為完成查詢條件

(((((((TS=(robot) OR TS=(robotic)) AND TS=(programming education)) AND TS=(computational thinking)) AND PY=(2006-2022)))) AND DT=(Article OR Review)) AND LA=(English)

最後共獲得 172 篇，0/172 的旁邊有方框打勾，依序加到 Add to Marked List (新增至勾選清單)，然後選 Export(匯出)，格式選 Plain Text File(純文字檔案)

Clarivate English Pro

Web of Science™ Search Sign In Register

Advanced Search > Results for ((((((TS=(robot) OR TS=(robotic)) AND TS=(programming educati...

172 results from Web of Science Core Collection for:

((((((TS=(robot) OR TS=(robotic)) AND TS=(programming education)) AND TS=(computational thinking)) AND PY=(2006-2022)) AND DT=(Article OR Review)) AND LA=(English)

Quick add keywords: + COMPUTATIONAL THINKING + COMPUTATIONAL THINKING EDUCATION + COMPUTATIONAL THINKING CT + PROGRAMM

Publications You may also like...

Refine results

Search within results...

Quick Filters

- Review Article 22
- Early Access 4
- Open Access 71
- Enriched Cited References 52
- Open publisher-invited reviews 3

50/172 Add To Marked List Export Sort by: Relevance 1 0

1 Effects of robotics programming on the computational thinking and creativity of elementary school students 60 Citations

Noh, J and Lee, J

Feb 2020 | ETR&D-EDUCATIONAL TECHNOLOGY RESEARCH AND DEVELOPMENT 68 (1), pp.463-484 55 References

Enriched Cited References

Around the world, programming education is actively promoted by such factors as economic and technical requirements. The use of a robot in programming education could help students understand computer-science concepts more easily. In this study we designed a course in programming a robot for elementary school students and investigated its effectiveness by implementing it in actual cl... Show more

下方選 Records from 1 to 172，再點選 Edit 按鈕，My custom export selections 全勾

Export Records to Plain Text File

Record Options

All records on page

Records from: 1 to 172

No more than 1000 records at a time

Record Content:

- Author, Title, Source
- Author, Title, Source, Abstract
- Full Record
- Full Record and Cited References
- Custom selection (11) Edit

My custom export selections (Web of Science Core Collection)

<input checked="" type="checkbox"/> Author, Title, Source	<input checked="" type="checkbox"/> Abstract, Keyword, Addresses	<input checked="" type="checkbox"/> Cited References and Use	<input checked="" type="checkbox"/> Funding and Other
<input checked="" type="checkbox"/> Author(s)	<input checked="" type="checkbox"/> Abstract	<input checked="" type="checkbox"/> Cited References	<input checked="" type="checkbox"/> Funding Information
<input checked="" type="checkbox"/> Title	<input checked="" type="checkbox"/> Addresses	<input checked="" type="checkbox"/> Cited Reference Count	<input checked="" type="checkbox"/> Publisher Information
<input checked="" type="checkbox"/> Source	<input checked="" type="checkbox"/> Affiliations	<input checked="" type="checkbox"/> Usage Count	<input checked="" type="checkbox"/> Open Access
<input checked="" type="checkbox"/> Conf.Info/Sponsors	<input checked="" type="checkbox"/> Document Type	<input checked="" type="checkbox"/> Hot Paper	<input checked="" type="checkbox"/> Page Count
<input checked="" type="checkbox"/> Times Cited Count	<input checked="" type="checkbox"/> Keywords	<input checked="" type="checkbox"/> Highly Cited	<input checked="" type="checkbox"/> Source Abbrev.
<input checked="" type="checkbox"/> Accession Number	<input checked="" type="checkbox"/> WoS Categories		<input checked="" type="checkbox"/> IDS Number
<input type="checkbox"/> Authors Identifiers	<input checked="" type="checkbox"/> Research Areas		<input checked="" type="checkbox"/> Language
<input type="checkbox"/> ISSN	<input checked="" type="checkbox"/> WoS Editions (print only)		
<input type="checkbox"/> PubMed ID			

Reset Cancel Save selections

點選 Export

Export Records to Plain Text File

Record Options

All records on page

Records from: to

No more than 1000 records at a time

Record Content:

Custom selection (26) ▾

Export

Cancel

輸出的檔案

savedrecs.txt - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明

FN Clarivate Analytics Web of Science

VR 1.0

PT J

AU Noh, J

Lee, J

AF Noh, Jiyae

Lee, Jeongmin

TI Effects of robotics programming on the computational thinking and
creativity of elementary school students

SO ETR&D-EDUCATIONAL TECHNOLOGY RESEARCH AND DEVELOPMENT

LA English

DT Article

DE Elementary education; Robotics programming; Computational thinking;
Creativity; Prior skill; Gender difference

ID GENDER; ENVIRONMENTS; STRATEGIES; LANGUAGES; ATTITUDE; SCRATCH; DESIGN;
IMPACT; SKILLS

AB Around the world, programming education is actively promoted by such factors as economic and
more in girls than in boys, and the mean difference was statistically significant, but the diffe

C1 [Noh, Jiyae; Lee, Jeongmin] Ewha Womans Univ, Dept Educ Technol, Coll Educ, 52 Ewhayeodae Gil
C3 Ewha Womans University

RP Lee, J (corresponding author), Ewha Womans Univ, Dept Educ Technol, Coll Educ, 52 Ewhayeodae (

EM gabiellove@naver.com; jeongmin@ewha.ac.kr

CR Akinola S.O., 2015, SCIENCE, V7, P1

Amabile T. M., 1989, GROWING CREATIVE NUR

[Anonymous], P KOREAN ASS COMPUTE

[Anonymous], 2008, LEARNING LEADING TEC, DOI DOI 10.1145/1518701.2167142

[Anonymous], 2012, 10 STEPS COMPLEX LEA

[Anonymous], SCORING TTCT

[Anonymous], COMMUNICATIONS MATH

[Anonymous], 2006, CREATIVE PROBLEM SOL

[Anonymous], 2002, J COMPUTING SCI COLL

[Anonymous], 1974, TEST CREATIVE THINKI

[Anonymous], COMP SCI STAND

[Anonymous], 2010, INSTRUCTIONAL DESIGN

[Anonymous], 1991, MULTIPLE REGRESSION

Atmatzidou S, 2016, ROBOT AUTON SYST, V75, P661, DOI 10.1016/j.robot.2015.10.008

BASER M, 2013, MIDDLE EAST J SCI RE, V14, P248, DOI DOI 10.5829/idosi.mejsr.2013.14.2.2007

Bers MU, 2014, COMPUT EDUC, V72, P145, DOI 10.1016/j.compedu.2013.10.020

Bland C G 2002, ACM SIGCSR R P191

<

3. 在 SCOPUS 用篩選條件設定或直接在進階搜尋中輸入以下資料，

(TITLE-ABS-KEY (robot OR robotic) AND TITLE-ABS-KEY (programming AND education) AND TITLE-ABS-KEY (computational AND thinking)) AND PUBYEAR > 2005 AND PUBYEAR < 2023 AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (PUBSTAGE , "final"))

The screenshot shows the Scopus search interface. At the top, there's a search bar and navigation links. Below the search bar, a welcome message is displayed. The main area features an advanced query input field, which is highlighted with a red box. The query is: `{ TITLE-ABS-KEY (robot) OR TITLE-ABS-KEY (robotic) AND TITLE-ABS-KEY (programming AND education) AND LANGUAGE (english) AND TITLE-ABS-KEY (computational AND thinking) } AND PUBYEAR > 2005 AND PUBYEAR < 2023 AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (PUBSTAGE , "final"))`. Below the query, there are options to save the search, set alerts, and edit the query. The search results section shows 74 documents found. A table of results is displayed, with the first document highlighted: "Employing Robotics in Education to Enhance Cognitive Development—A Pilot Study" by Kálózi-Szabó, C., Mohai, K., and Cottini, M., published in Sustainability (Switzerland) in 2022.

找到 74 篇資料後，選取全部筆數→匯出→檔案類型選 CSV→選取匯出時每一個都勾

This screenshot shows the same Scopus search results page as above, but with the export options menu open. The menu is highlighted with a red box and lists various file types for export: CSV, RIS, BibTeX, Plain text, Reference managers (Mendeley, Zotero (RIS), EndNote (RIS)), Platforms, and SciVal. The 'All' option is selected, and the 'Export' button is highlighted with a red box. The search results table is visible in the background, showing the same document as in the previous screenshot.

二、安裝軟體

1。下載 RSTUDIO 和 R，並完成安裝

安裝 R 語言 <https://www.r-project.org/>

點選左上方的 CRAN，可選 Taiwan 的 <https://cran.csie.ntu.edu.tw/>

安裝 R Studio <https://posit.co/download/rstudio-desktop/>

2。開啓 RStudio 後輸入以下語法

```
setwd("D:/BIBLIO")
# install.packages("bibliometrix")
library(bibliometrix)
library(WriteXLS)
#讀入 WOS 資料
WOSfile <- "D:/BIBLIO/savedrecs.txt"
M_WOS <- convert2df(WOSfile, dbsource = "wos", format = "plaintext")
head(M_WOS["TC"])

#讀入 Scopus 資料
Scopusfile <- "D:/BIBLIO/scopus.csv"
M_Sopus <- convert2df(Scopusfile, dbsource = "scopus", format = "csv")
head(M_Sopus["TC"])

#合併資料
Merge<- mergeDbSources(M_WOS, M_Sopus, remove.duplicated = TRUE)
write.csv(Merge, "scopus_wos.csv", row.names = TRUE)

#執行 bibliometric 圖形介面
biblioshiny()
```

畫面如下所示，若出現 Packages bibliometrix and WriteXLS required but are not installed... 點一下旁邊的 install 安裝

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

bibliometrix.R*

Source on Save

⚠ Packages bibliometrix and WriteXLS required but are not installed **Install** Don't Show Again

```
1 setwd("D:/BIBLIO")
2 # install.packages("bibliometrix")
3 library(bibliometrix)
4 library(writeXLS)
5 #讀入WOS資料
6 WOSfile <- "D:/BIBLIO/savedrecs.txt"
7 M_WOS <- convert2df(WOSfile, dbsource = "wos", format = "plaintext")
8 head(M_WOS["TC"])
9
10 #讀入Scopus資料
11 Scopusfile <- "D:/BIBLIO/scopus.csv"
12 M_Sopus <- convert2df(Scopusfile, dbsource = "scopus", format = "csv")
13 head(M_Sopus["TC"])
14
15 #合併資料
16 Merge<- mergeDbSources(M_WOS, M_Sopus, remove.duplicated = TRUE)
17 write.csv(Merge, "scopus_wos.csv", row.names = TRUE)
18
19 #執行bibliometric圖形介面
20 biblioshiny()
21
22
```

11:25 (Top Level) ↕

Console Terminal Background Jobs

R 4.3.1 · ~/

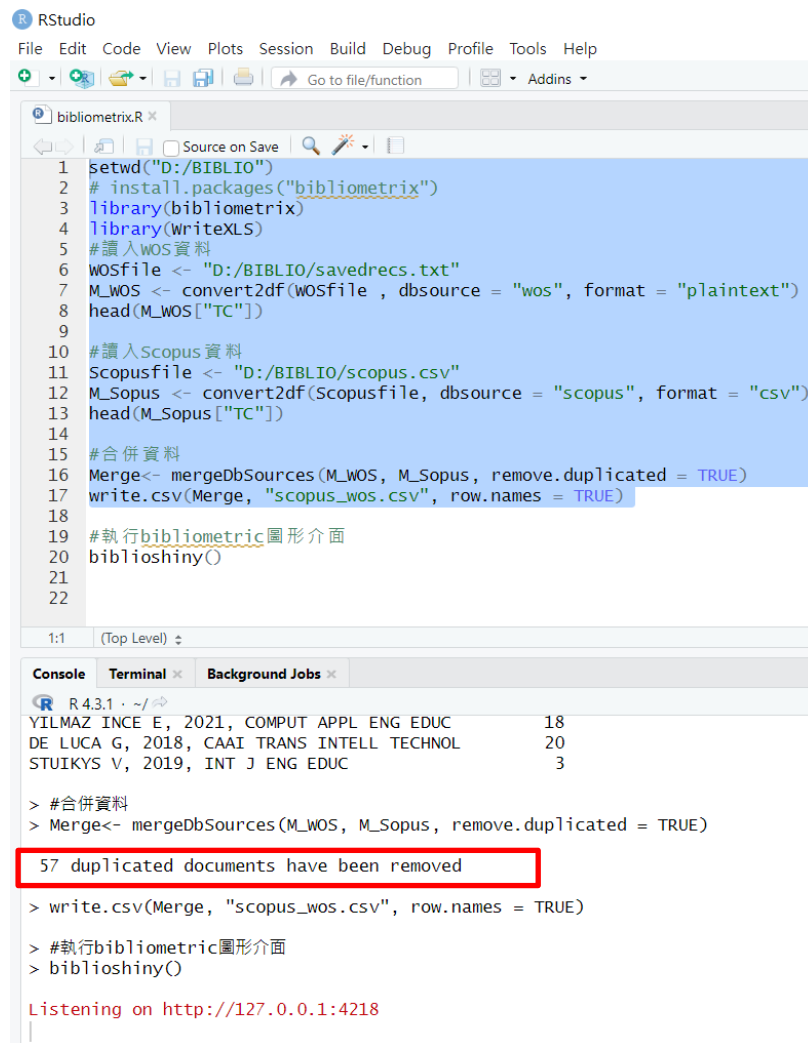
R version 4.3.1 (2023-06-16 ucrt) -- "Beagle Scouts"
Copyright (C) 2023 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

先像下方選取程式，再按 CTRL+ALT+R 可以執行程式，可以發現下方有顯示 57 筆資料重覆。也就是說 WOS 172 筆，SCOPUS 74 筆，扣除重覆 57 筆，剩下 189 筆。



```
1 setwd("D:/BIBLIO")
2 # install.packages("bibliometrix")
3 library(bibliometrix)
4 library(writeXLS)
5 #讀入WOS資料
6 WOSfile <- "D:/BIBLIO/savedrecs.txt"
7 M_WOS <- convert2df(WOSfile, dbsource = "wos", format = "plaintext")
8 head(M_WOS["TC"])
9
10 #讀入Scopus資料
11 Scopusfile <- "D:/BIBLIO/scopus.csv"
12 M_Sopus <- convert2df(Scopusfile, dbsource = "scopus", format = "csv")
13 head(M_Sopus["TC"])
14
15 #合併資料
16 Merge<- mergeDbSources(M_WOS, M_Sopus, remove.duplicated = TRUE)
17 write.csv(Merge, "scopus_wos.csv", row.names = TRUE)
18
19 #執行bibliometric圖形介面
20 biblioshiny()
21
22
```

Console Output:

```
R 4.3.1 ~ /
YILMAZ INCE E, 2021, COMPUT APPL ENG EDUC 18
DE LUCA G, 2018, CAAI TRANS INTELL TECHNOL 20
STUIKYS V, 2019, INT J ENG EDUC 3

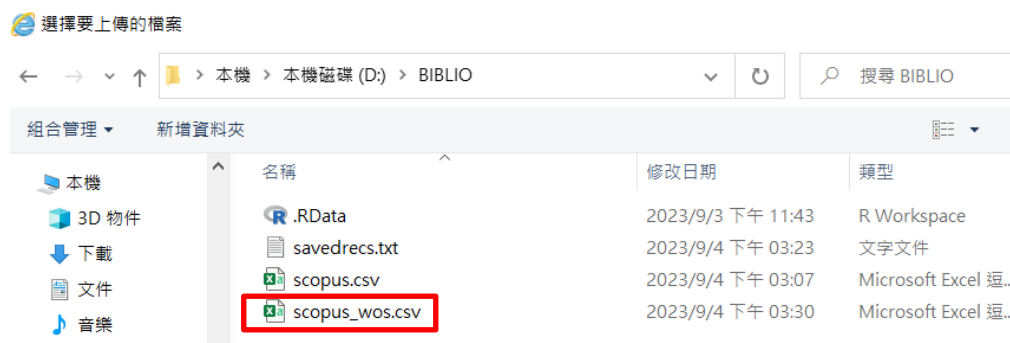
> #合併資料
> Merge<- mergeDbSources(M_WOS, M_Sopus, remove.duplicated = TRUE)
57 duplicated documents have been removed

> write.csv(Merge, "scopus_wos.csv", row.names = TRUE)

> #執行bibliometric圖形介面
> biblioshiny()

Listening on http://127.0.0.1:4218
```

在 BIBLIO 資料夾會出現一個檔案 scopus_wos.csv

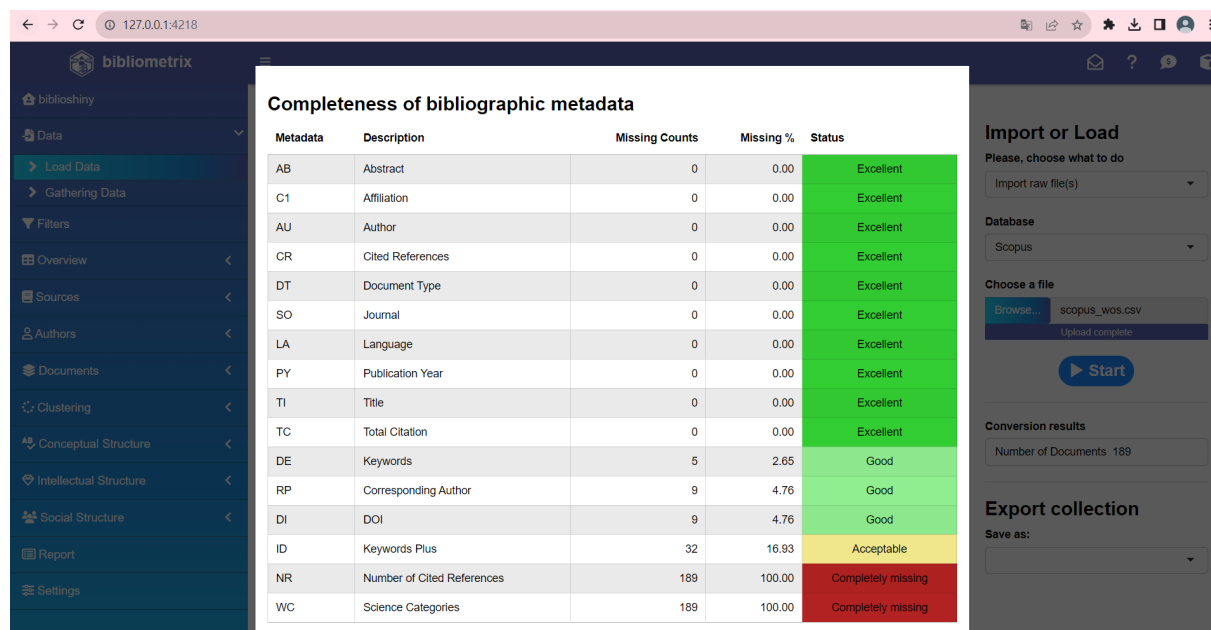
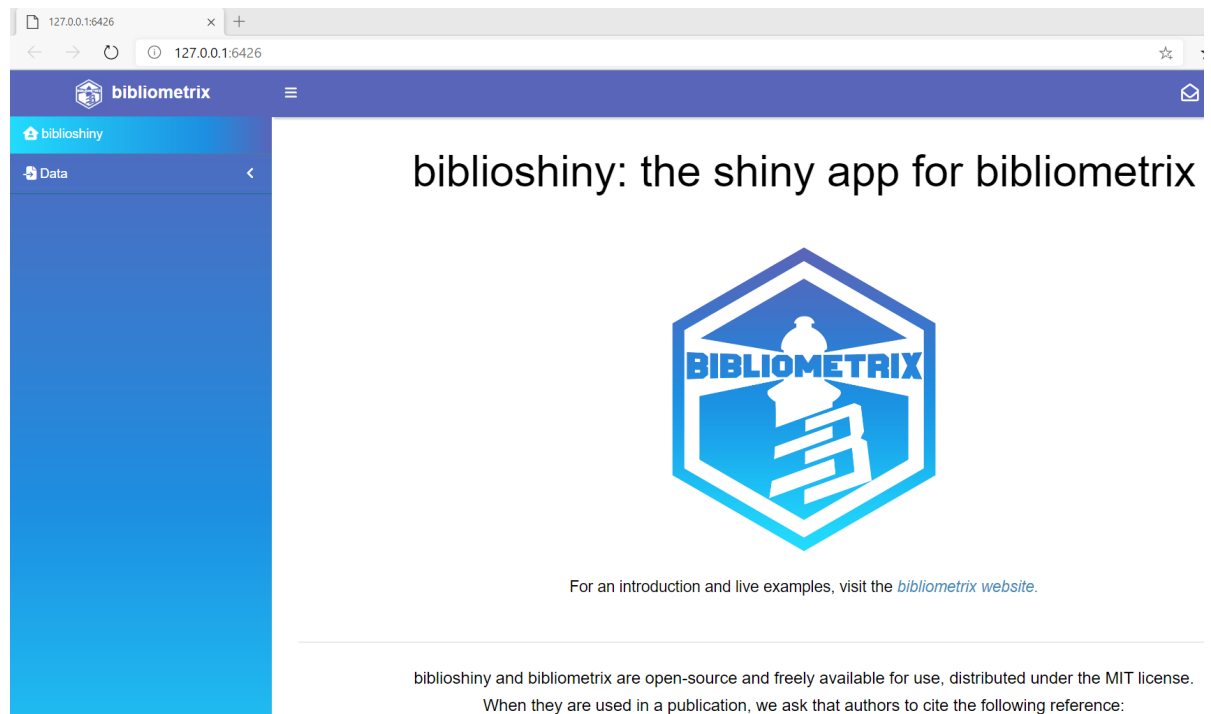


註：若以後要練習使用 bibliometrix，而不要用上述合併檔的話，也可以在 R Studio 輸入以下兩行就能開啓了。

```
library(bibliometrix)
biblioshiny()
```

三、Bibliometrix 載入資料

出現以下畫面後，點選 Data→Load Data，在右側方塊選擇 import raw file，Database 選 Scopus，Choose a file 選擇 scopus_wos.csv，再點選 Start
出現的視窗是說明兩個資料有沒有抓完整的程度，點選 Close 可以關閉

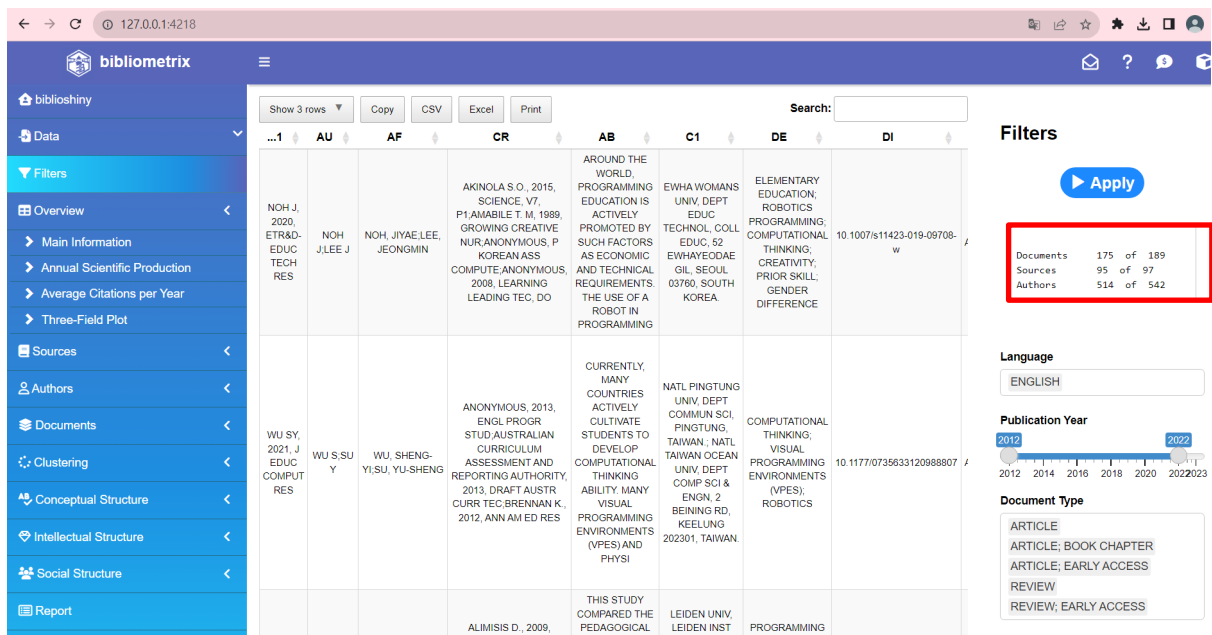


BIBLIOMETRIX 畫面可以點選左側的 Filters，檢查一下右側的 publication year 及 document type，可以確認抓取的資料是否正確，若有錯誤，要在這裡修改，例如

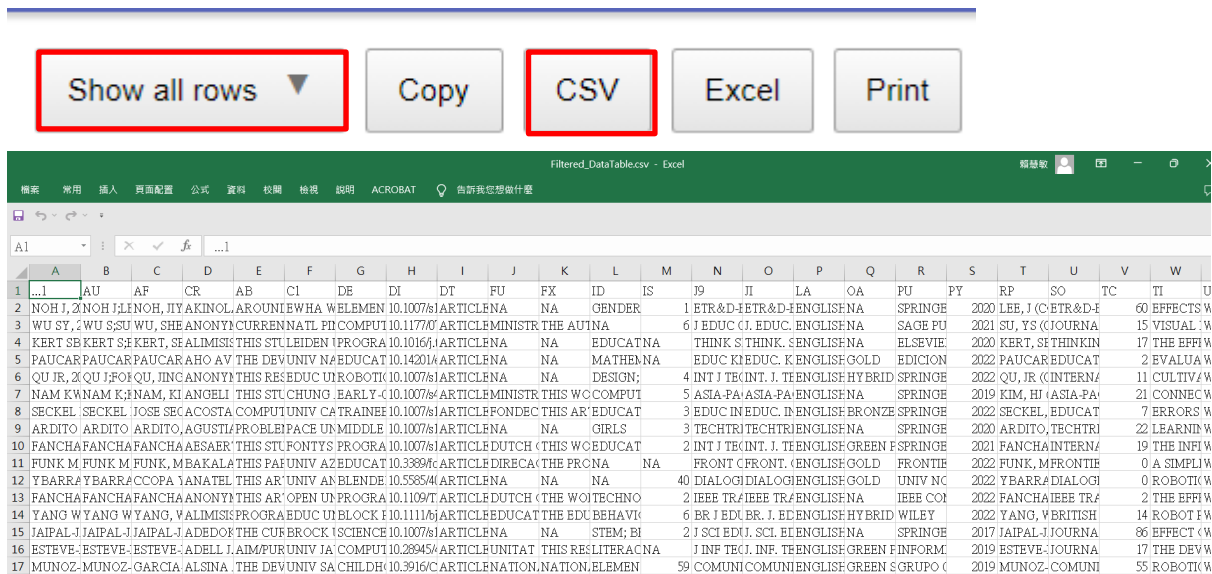
Publication Year 選到了 2023 了，我們只要抓到 2022，這時可以拉一下調整，並且要按下 Apply。



按下 Apply 之後會出現以下畫面，這時候筆數只剩下 175 篇了。



以下圖選 Show all rows，再點 CSV，可以匯出 175 篇，檔名會是 Filtered_DataTable.csv。這個檔案告訴我們只有 175 篇，所以我們必須再去看原本的 scopus_wos.csv，刪除 scopus_wos.csv 檔裡不符合的記錄。



因為要將兩個檔案 `scopus_wos.csv` 和 `Filtered_DataTable.csv` 做比對，可以先將 `scopus_wos.csv` 另存一個新檔，例如存成 `scopus_wos_比對 1.csv`。然後在 `scopus_wos_比對 1.csv` 此檔案新增一欄，並在 A2 輸入以下語法
`=VLOOKUP(X2,Filtered_DataTable.csv!$W:$W,1,FALSE)`

透過比較兩個檔案的論文標題，可以知道哪些在 `Filtered_DataTable.csv` 檔案裡面是空值（#N/A），找出來之後要手動確認一下再刪除。

因為在兩個檔案的論文標題可能是同一篇，但是後面截掉部份文字而被以為是空值。

例如： 以下兩筆是同一篇，需要被保留

`Scopus_wos_比對 1.csv` 的第 52 筆

COMPARISON OF OBJECTORIENTED AND ROBOT PROGRAMMING ACTIVITIES
 THE EFFECTS OF PROGRAMMING MODALITY ON STUDENT ACHIEVEMENT
 ABSTRACTION PROBLEM SOLVING AND MOTIVATION

`Filtered_DataTable.csv` 的第 50 筆

COMPARISON OF OBJECTORIENTED AND ROBOT PROGRAMMING ACTIVITIES
 THE EFFECTS OF PROGRAMMING MODALITY ON STUDENT ACHIEVEMENT
 ABSTRACTION PROBLEM SOLVING A

結果如下圖

scopus_wos_比對_1_刪除重複2023_初步篩選文獻 174.csv - Excel

檔案 常用 插入 頁面配置 公式 資料 校閱 檢視 說明 ACROBAT 告訴我您想做什麼

A1 第一版篩選結果

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R				
151	BERS M		BERS M;BERS M	BERS, M.	ABELSOJ	COMPUT	TUFTS U	CODING	10.1007/s4	ARTICLE	NA	COMPUT	4	J	COMPUJ.	COMPT	ENGLISH					
152	STUIKYS V;BURB		STUIKYS;STUIKYS	STUIKYS	ANDERS	CURREN	KAUNA	STEM-DF	NA	ARTICLE	NA	GENERA	4	INT	J	EN(INT. J. EN	ENGLISH				
153	SHARMIN S		SHARMI;SHARMI	SHARMI	AMABIL	COMPUT	UNIV TO	CREATIV	10.1145/3	REVIEW	NA	NA	MOTIVA	2	ACM T	CACM	TR.	ENGLISH				
154	SUN L;HU L;ZHOU		SUN LH;SUN LH	SUN, LI	HALL	MIN	THE	EMINZU	USTEM	AC	10.1016/j	ARTICLE	NATION,	THIS	WCS	SKILLS;	(NA	THINK S	THINK. S	ENGLISH		
155	PATINO-ESCARCI		PATINO-PATINO	PATINO-	AGGARV	WITH	AT	UNIV	CAROBOTI	(10.1007/sj	ARTICLE	CNPQ	BF	THIS	W	COMPUT	2	J	INTELL	J. INTELL	ENGLISH	
156	DAGIENE V;HRO		DAGIENI	DAGIENI	DAGIENI	ANDERS	COMPUT	VILNIUS	INFORM.	10.15388/4	ARTICLE	NA	NA	3	INFORM	INFORM.	ENGLIS					
157	VALENTE J;CACE		VALENT	VALENT	VALENT	ACKERM	CONSTR	UNIV	ES'CONSTR	10.1111/bj	ARTICLE	NATION,	NATION,	NA	3	BRIT	J	BR. J. ED	ENGLISH			
158	BERS M;SULLIVA		BERS M;BERS M;	BERS, M.	ABELSOJ	AIM/PUR	TUFTS U	EARLY C	10.28945/4	ARTICLE	NA	COMPUT	NA	J	INF	TECJ.	INF. TE	ENGLISH				
159	新增		QUINTA;QUINTA	QUINTA;	AMANTEIN	EARL	UNIVER	COMPUTA	TIONAI	ARTICLE												
160	新增		SUBRAM;SUBRAM	SUBRAM	ABDULL	AS	A	RE	NATION,	COMPUT	10.18844/4	REVIEW	FACULT	FUNDING	TEXT	1:	6	CYPRIO	1CYPRIO	ENGLISH		
161	新增		DE LUC;DE L G;	C	DE LUC	DIJKSTR	TEACH	ARIZON	EDUCAT	10.37965/4	ARTICLE	FURI;	AR	THE	RESEARCH	K	1	J	ARTIF	IJ. ARTIF.	ENGLISH	
162	新增		VALLAN	VALLAN	VALLAN	WING	J.	THE	PAP	DEPART	COMPUTA	TIONAI	ARTICLE									
163	新增		DURAK	DURAK	DURAK,	ADLEBE	THE	PUR	BARTIN	COMPUT	10.30935/4	ARTICLE	BARTIN	THIS	STUDY	WAS	2	CONTEM	CONTEM	ENGLISH		
164	WITHERSPOON E;		WITHER;	WITHER;	WITHER;	REBOOT	COMPUT	LEARNI	COMPUT	10.1145/3	ARTICLE	NATION,	THIS	W	COMPUT	1	ACM	J	TI	ACM	J. T	ENGLISH
165	新增		CHOI S-U	CHOI S;M	CHOI, SU	BAE	H.,	IFOR	BO	DEPART	CONSTR	10.3923/4	ARTICLE									
166	TENGLER K;SABI		TENGLEI	TENGLEI	TENGLEI	GROVER	THOUGH	UNIVER	EDUCAT	10.3991/4j	ARTICLE											
167	新增		S'EZ L'P;	S'EZ L J;	S'EZ L'P;	BAY	TAK	THIS	STU	UNIVER	COMPUT	10.5944/4i	ARTICLE									
168	BERS M	新增	BERS M;BERS M	BERS, M.	ALBO-C	THIS	PAFELIOT	PE	CODING	10.12795/1	REVIEW	KINDERI	THE	KIBO	ROBOT	62	PI	籐XEL	PI籐XEL	ENGLISH		
169	DIAGO P;GONZL		DIAGO P	DIAGO P	DIAGO, I	AMBRO	INTERES	DEPART	BEE-BO	10.1016/j	ARTICLE	MINISTE	THIS	WORK	WAS	SUPPORT	INT	J	CHINT.	J. CI	ENGLISH	
170	MONTES N;ROSIL		MONTES	MONTES	MONTES	PEDERSE	OVER	TH	DEPART	COMPUT	10.3390/2	ARTICLE	GENERA	FUNDIN	(ROBOT	F	3	SENSOR;	SENSOR;	ENGLISH		
171	PAUCAR-CURASN		PAUCAR	PAUCAR	PAUCAR	AHO A.	THE	DEV	UNIVER	COMPUT	10.14201/4	ARTICLE										
172	新增		MACRID	MACRID	MACRID	ANGELI	THE	CUF	UNIVER	COMPUT	10.1016/j	ARTICLE										
173	ANGELI C		ANGELI	ANGELI	ANGELI,	ANGELI	WORKE	UNIVER	ALGORI	10.1016/j	ARTICLE											
174	BARTH-COHEN L;		BARTH-	(BARTH-	(BARTH-	(AHO A.	V	ALTHOU	DEPART	COMPUT	10.1007/s4	ARTICLE	NATION,	THANKS	TO	ALL	1	月2	JOURNA	JOURNA	ENGLISH	
175	SUNG W	新增	SUNG W	SUNG W	SUNG, W	ABRAH	A	SCIEN	DEPART	COMPUT	10.1007/sj	ARTICLE										

scopus_wos_比對_1_刪除重複2023_初步篩選文獻

接下來採用 PRISMA 流程圖去選擇文獻，通常由 2-3 位作者分開看。在這過程中會去註記初篩結果（0 表不納入、1 表納入），同時也會將不屬於此主題或是語言錯誤（例如斯洛文尼亞語）的文章不納入。

scopus_wos_比對_2_刪除重複2023_專家一致性 170.csv - Excel

檔案 常用 插入 頁面配置 公式 資料 校閱 檢視 說明 ACROBAT 告訴我您想做什麼

A1 與第一版檢索結果

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	與第一版檢索結果	新增文章ID		PRISMA初篩(仁誠)	PRISMA初篩(慧敏)	不一致	初篩結果	AU	AF	CR	AB	C1	DE	
1	VLOOKUP比較													
2	EFFECTS OF ROBO	1		1		1	納入	NOH J, 2	NOH J;LINOH, JY	AKINOL	AROUNTE	WHA	WELEMEN	
3	VISUAL PROGRAM	2		1		1	納入	WU SY, 4	WU S;SU WU, SHE	ANONY	CURREN	NATL	PR	COMPUT
4	THE EFFECT OF R	3		1		1	納入	KERT SB	KERT S;E	KERT, SE	ALIMISIS	THIS	STU	LEIDEN
5	EVALUATION OF	4		1		1	納入	PAUCAR	PAUCAR	PAUCAR	AHO AV	THE	DEV	UNIV
6	CULTIVATING ST	5		1		1	納入	QU JR, 2	QU J;FOI	QU, JINC	ANONY	THIS	RES	EDUC
7	CONNECTING PLA	6		1		1	納入	NAM K	WNAM K;INAM, KI	ANGELI	THIS	STU	CHUNG	
8	ERRORS OF PROC	7		1		1	納入	SECKEL	SECKEL	JOSE	SEC	ACOSTA	COMPUT	
9	LEARNING COMP	8		1		1	納入	ARDITO	ARDITO	ARDITO,	AGUSTI	PROBLE	IPACE	
10	THE INFLUENCE	9		1		1	納入	FANCHA	FANCHA	FANCHA	AESAER	THIS	STU	
11	A SIMPLE INTERA	10		1		1	納入	FUNK M	FUNK M	FUNK, M	BAKALA	THIS	PAF	
12	THE EFFECT ON C	12		1		1	納入	FANCHA	FANCHA	FANCHA	ANONY	THIS	AR	
13	ROBOT PROGRAM	13		1		1	納入	YANG W	YANG W	YANG, V	ALIMISIS	PROGRA	EDUC	
14	EFFECT OF ROBO	14		1		1	納入	JAIPAL	J	JAIPAL	J	JAIPAL	J	ADEDO
15	THE DEVELOPME	15		1		1	納入	ESTEVE	-ESTEVE	-ESTEVE	ADELL	J	AIM	
16	ROBOTICS TO DE	16		1		1	納入	MUNOZ	-MUNOZ	-GARCIA	ALSINA	THE	DEV	
17	COMPUTATIONAL	17		1		1	納入	POU AV,	POU A;	C	POU, AL	ACKER	MIN	
18	COMPUTATIONAL	18		1		1	納入	BERS M	BERS M;	BERS, M.	ANONY	BY	ENG	
19	FOSTERING COMI	19		1		1	納入	SILVA R,	SILVA R;	SILVA, R	DELGAD	THERE		
20	DRONE CHALLENGE	20		0		0		BERMUI	BERMUI	BERMUI	BOWER	THE		
21	PRESERVICE ANE	21		1		1	納入	PIE	DADE	PIE	DADE	NUNES		
22	INSERVICE TEACJ	22		0		0		PAPADA	PAPADA	PAPADA	ANONY	CHILDR		
23	PROGRAMMING I	23		1		1	納入	BERS M	BERS M;	BERS, M.	ANONY	THIS		
24	THE EFFECT OF PI	24		0		0		SAEZ-LO	SAEZ-LO	SAEZ-LO	AIKEN	L		
25	ASSESSING THE	25		0		0		CHEN	CHEN	G	CHEN	C		

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可以用 GOOGLE 試算表輸入以下，透過中文摘要可以更容易的判斷文章。

=GOOGLETRANSLATE(L2,"en","zh-tw")

1	ID	PRISMA初篩(仁)	PRISMA初篩(慧)	不一致	初篩結果	AU	AF	CR	AB	AB(中文)	C1	DE
2	1	1	1	1	納入	NOH J, 2020, E	NOH J, LEE J	NOH, JIYAE, LEI	AKINOLA S. O.,	AROUND THE		EWHA WOMAN ELEMEN
3	2	1	1	1	納入	WU SY, 2021, J	WU S, SU Y	WU, SHENG-YI,	ANONYMOUS, ;	CURRENTLY, M	目前、許多國家	NATL PINGTUN COMPU
4	3	1	1	1	納入	KERT SB, 2020,	KERT S, ERKOC	KERT, SERHAT	ALIMISIS D., ;	20 THIS STUDY C	這項研究比較了	LEIDEN UNIV, L PROGR
5	4	1	1	1	納入	PAUCAR-CURA	PAUCAR-CURA	PAUCAR-AHO AV,	2012, (THE DEVELOP	小學生的計算思	UNIV NAEL AU' EDUCA	
6	5	1	1	1	納入	QU JR, 2022, I	QU J, FOK P	QU, JING RU, F	(ANONYMOUS, ;	THIS RESEARC	這項研究的重點	EDUC UNIV HO ROBOT
7	6	1	1	1	納入	NAM KW, 2019,	NAM K, KIM H	LI NAM, KI WON, K	ANGELI C, 2016	THIS STUDY EX	這項研究研究了	CHUNG ANG UI EARLY-
8	7	1	1	1	納入	SECKEL MJ, 20	SECKEL M, VAS	JOSE SECKEL,	ACOSTA, 2018,	COMPUTATION	教育環境中的計	UNIV CATHOLIC/ TRAI
9	8	1	1	1	納入	ARDITO G, 202	ARDITO G, CZEI	ARDITO, GERA	AGUSTIANI H.,	PROBLEM-SOL	解決問題和批判	PACE UNIV, SC MIDDLE
10	9	1	1	1	納入	FANCHAMPS N	FANCHAMPS N	FANCHAMPS, N	AESAERT K, 20	THIS STUDY IN	這項研究將算法	FONTYS UNIV / PROGR
11	10	1	1	1	納入	FUNK M, 2022,	FUNK M, CASÇ	FUNK, MATTHI	BAKALA E., 202	THIS PAPER DE	本文描述了在讀	UNIV AZORES, EDUCA
12	12	1	1	1	納入	FANCHAMPS N	FANCHAMPS N	FANCHAMPS, N	ANONYMOUS, ;	THIS ARTICLE	本文說明、任務	OPEN UNIV NEI PROGR
13	13	1	1	1	納入	YANG WP, 2022	YANG W, NG D,	(YANG, WEIPEN	ALIMISIS D., ;	20 PROGRAMMAB	可編程機器人技	EDUC UNIV HO BLOCK
14	14	1	1	1	納入	JAIPAL-JAMANI	JAIPAL-JAMANI	JAIPAL-JAMANI	ADEDOKUN OA	THE CURRENT	目前在K-12教育	BROCK UNIV, D SCIENC
15	15	1	1	1	納入	ESTEVE-MON F	ESTEVE-MON F	ESTEVE-MON,	ADELL J., 2017,	AIM/PURPOSE	目標目的本研究	UNIV JAUME 1, COMPU
16	16	1	1	1	納入	MUNOZ-REPI	MUNOZ-REPI	(GARCIA-VALCA	ALSINA A., 201	THE DEVELOP	編程技術的發展	UNIV SALAMAN CHILDH
17	17	1	1	1	納入	POU AV, 2022,	(POU A, CANALE	POU, ALBERT	VACKERMANN E	IN THE CONTE	在教育中的科學	RAMON LLULL, COMPU
18	18	1	1	1	納入	BERS MU, 2014	BERS M, FLANN	BERS, MARINA	ANONYMOUS, ;	BY ENGAGING	通過從事基於建	TUFTS UNIV, M ELEMEN
19	19	1	1	1	納入	SILVA R, 2021,	(SILVA R, FONSE	SILVA, RICARD	DELGADO VA, ;	THERE IS A GR	在小學生的日常	UNIV TRAS OS COMPU
20	20	0	0	0		BERMUDEZ A,	(BERMUDEZ A, C	BERMUDEZ, AL	BOWER T, 2016	THE DEVELOP	與計機編程和	UNIV CASTILLA ENGINE
21	21	1	1	1	納入	PIEADADE JMN,	PIEADADE J	NUNES PIEADA	ANONYMOUS, ;	THIS PAPER PR	本文介紹了一項	UNIV LISBON, I COMPU
22	22	0	0	0		PAPADAKIS S,	(PAPADAKIS S	PAPADAKIS, ST	ANONYMOUS, ;	CHILDREN TOC	當今的兒童生活	UNIV CRETE, D EDUCA
23	23	1	1	1	納入	BERS MU, 2012	BERS M, ETTIN	BERS, MARINA	ANONYMOUS, ;	THIS CHAPTER	本章提出了一項	TUFTS UNIV, EI NA
24	24	0	0	0		SAEZ-LOPEZ JI	SAEZ-LOPEZ J,	SAEZ-LOPEZ, J	AIKEN LR, 1980	THIS STUDY HI	這項研究強調了	SPANISH NATL, COMPU
25	25	1	1	1	納入	CHEN GH, 2017	CHEN G, SHEN	CHEN, GUANH	AHO AV, 2012,	(BASED ON A FI	根據根據計算機	UNIV MIAMI, 52 COMPU

兩位作者不一致的地方要再討論，再確定初篩結果（納入或不納入）。若有作者 3 的話，也可以由他來判定。下圖顯示共 70 筆納入。

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O		
與第一版檢索結果	新增文章ID	PRISMA初篩(仁誠)	PRISMA初篩(慧敏)	不一致	初篩結果	AU	AF	CR	AB	C1	DE	DI				
1	UP比對				納入											
2	EFFECTS OF ROBO	1	1	1	納入	NOH J, 2020, E	NOH J, LEE J	NOH, JIYAE, LEI	AKINOLA S. O.,	AROUND THE		EWHA WEL	ELEMEN	10.1		
3	VISUAL PROGRAM	2	1	1	納入	WU SY, 2021, J	WU S, SU Y	WU, SHE ANONY	CURRENNATL	PI COMPU	10.1					
4	THE EFFECT OF R	3	1	1	納入	KERT SB, 2020,	KERT S, ERKOC	KERT, SE ALIMISIS	THIS STULEIDEN	PROGRA	10.1					
5	EVALUATION OF	4	1	1	納入	PAUCAR PAUCAR	PAUCAR AHO AV	THE DEV UNIV N	EDUCAT	10.1						
6	CULTIVATING ST	5	1	1	納入	QU JR, 2022, I	QU J, FOK P	QU, JING RU, F	(ANONYNY	THIS RESE	EDUC UI	ROBOT	(10.1			
7	CONNECTING PLA	6	1	1	納入	NAM KWNAM K,	LI NAM, KI ANGELI	THIS STU	CHUNG	EARLY- (10.1						
8	ERRORS OF PROG	7	1	1	納入	SECKEL SECKEL	JOSE SEC	ACOSTA	COMPUTUNIV	CA	TRAI	NEE	(10.1			
9	LEARNING COMP	8	1	1	納入	ARDITO ARDITO	ARDITO, AGUSTI	PROBLE	PACE	UM	MIDDLE	10.1				
10	THE INFLUENCE	9	1	1	納入	ANCHAFANCHA	FANCHA	AESAER	THIS STU	FONTYS	PROGRA	10.1				
11	A SIMPLE INTERA	10	1	1	納入	UNK M FUNK	M FUNK, M	BAKALA	THIS PA	UNIV	AZ	EDUCAT	10.3			
12	THE EFFECT ON C	12	1	1	納入	ANCHAFANCHA	FANCHA	ANONYNY	THIS AR	OPEN	UN	PROGRA	10.1			
13	ROBOT PROGRAM	13	1	1	納入	ANG W YANG	W YANG, V	ALMISIS	PROGRA	EDUC	UI	BLOCK	F	10.1		
14	EFFECT OF ROBO	14	1	1	納入	AIPAL-J JAIPAL	J JAIPAL-J	ADEDOK	THE CUF	BROCK	I	SCIENCE	10.1			
15	THE DEVELOPME	15	1	1	納入	STEVE-ESTEVE-	ESTEVE-:	ADELL J.	AIM/PUR	UNIV	JA	COMPU	10.2			
16	ROBOTICS TO DE	16	1	1	納入	MUNOZ-MUNOZ-	GARCIA	ALSINA	THE DEV	UNIV	SA	CHILDH	(10.3			
17	COMPUTATIONAI	17	1	1	納入	POU AV, POU	A; C POU, AL	ACKERM	IN THE	CRAMON	COMPU	10.3				
18	COMPUTATIONAI	18	1	1	納入	ERS MU BERS	M; BERS, M	ANONYNY	BY ENG	TUFTS	U	ELEMEN	10.1			
19	FOSTERING COMI	19	1	1	納入	ILVA R, SILVA	R, SILVA, R	DELGAD	THERE	KUNIV	TR	COMPU	10.3			
21	PRESERVICE ANI	21	1	1	納入	IEDADE	PIEADA	NUNES	F ANONYNY	THIS PA	UNIV	LIS	COMPU	10.2		
23	PROGRAMMING	23	1	1	納入	ERS MU BERS	M; BERS, M	ANONYNY	THIS CH,	TUFTS	U	NA	10.4			
25	ASSESSING ELEM	25	1	1	納入	CHEN G	CHEN G; CHEN,	G AHO	AV	BASED	CUNIV	M	COMPU	10.1		
26	ACTIVE LEARNIN	26	1	1	納入	BURLES	BURLES	BURLES	(ANONYNY	AS	COMIRORY	M	COMPU	10.1		
27	OBSERVATIONAL	27	1	1	納入	ERROB	TERR	ROB	AHO	AV	THIS	AR	UNIV	L	COMPU	10.1
28	COMPUTATIONAI	28	1	1	納入	EDEN	LALDEN	LALDEN	ALMISIS	TODAY	EUROPE	COMPU	10.3			

把上述檔案納入的 70 筆資料，存成另一個檔案（乾淨的檔案）。

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	與第一版檢索結果 VLOOKUP比對	新增文章	ENDNOTE	ID	PRISMA	PRISMA	不一致	初篩結果		AU	AF	CR	AB
2	EFFECTS OF ROBOTICS PROGRAMMING ON THE COMPUTATIONAL THINKING AND CREATIVITY OF ELEMENTARY SCHOOL STUDENTS		V	1	1	1	納入		NOH J, 2020, ETR&NOH J;LENOH, JY AKINOL AROUNDI				
3	VISUAL PROGRAMMING ENVIRONMENTS AND COMPUTATIONAL THINKING PERFORMANCE OF FIFTH AND SIXTH GRADE STUDENTS		V	2	1	1	納入		WU SY, 2021, J ED WU S;SU WU, SHE ANONY CURREN				
4	THE EFFECT OF ROBOTICS ON SIX GRADERS ACADEMIC ACHIEVEMENT COMPUTATIONAL THINKING SKILLS AND CONCEPTUAL KNOWLEDGE LEVELS		V	3	1	1	納入		KERT SB, 2020, TH KERT S;E KERT, SEALIMISIS THIS STU				
5	EVALUATION OF COMPUTATIONAL THINKING USING FOUR EDUCATIONAL ROBOTS WITH PRIMARY SCHOOL STUDENTS IN PERU		V	4	1	1	納入		PAUCAR-CURASO PAUCAR PAUCAR AHO AV THE DEV				
6	CULTIVATING STUDENTS COMPUTATIONAL THINKING THROUGH STUDENTROBOT INTERACTIONS IN ROBOTICS EDUCATION		V	5	1	1	納入		QU JR, 2022, INT J QU J;FOU QU, JING ANONY THIS RES				
7	CONNECTING PLANS TO ACTION THE EFFECTS OF A CARDCODED ROBOTICS CURRICULUM AND ACTIVITIES ON KOREAN KINDERGARTNERS		V	6	1	1	納入		NAM KW, 2019, A;NAM K;NAM, KI ANGELI THIS STU				
8	ERRORS OF PROGRAMMING AND OWNERSHIP OF THE ROBOT CONCEPT MADE BY TRAINEE KINDERGARTEN TEACHERS DURING AN INDUCTION TRAINING		V	7	1	1	納入		SECKEL MJ, 2022, SECKEL JOSE SECACOSTA COMPUT				

上面的檔案再把 A 到 H 欄刪除，這樣才能再回到 BIBLIOMETRIX 分析。

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	PY
1	AU	AF	CR	AB	CI	DE	DI	DT	FU	FX	ID	IS	J9	JJ	LA	OA	PU	PT	
2	NOH J, 2020, ETR&NOH J;LENOH, JY AKINOL AROUNDI EWHA WELEMEN 10.1007/s1													1	ETR&D-FETR&D-F	ENGLISH:NA	SPRINGE		
3	WU SY, 2021, J ED WU S;SU WU, SHE ANONY CURRENATL PIPCOMPUT10.1177/07													6	J EDUC (I. EDUC.	ENGLISH:NA	SAGE PU		
4	KERT SB, 2020, TH KERT S;E KERT, SEALIMISIS THIS STULEIDEN UPROGRA 10.1016/j														THINK S; THINK.	ENGLISH:NA	ELSEVIE		
5	PAUCAR PAUCAR PAUCAR AHO AV THE DEV UNIV NA EDUCAT 10.14201/a														EDUC K EDUC. K	ENGLISH:GOLD	EDICION		
6	QU JR, 2022, INT J QU J;FOU QU, JING ANONY THIS RES EDUC UNROBOTI 10.1007/s1														INT J TE (INT. I.	TE ENGLISH:HYBRID	SPRINGE		
7	NAM KW, 2019, A;NAM K;NAM, KI ANGELI THIS STUCHUNG EARLY-C 10.1007/s4														5	ASIA-PA/ASIA-PA	ENGLISH:NA	SPRINGE	
8	SECKEL JOSE SECACOSTA COMPUT UNIV CATRAINEE 10.1007/s1														3	EDUC IN EDUC. I	ENGLISH:BRONZE	SPRINGE	
9	ARDITO, 2020, ARDITO, AGUSTI/PROBLEIPACE UNMIDDLE 10.1007/s1														3	TECHTRI	TECHTRI	ENGLISH:NA	SPRINGE
10	FANCHAFANCHAFANCHAFANONONY THIS AR OPEN UNPROGRA 10.1109/T														2	IEEE T LI	IEEE TR	ENGLISH:NA	IEEE COM
11	FUNK M, 2020, FUNK M, MBAKALATHIS PAF UNIV AZ EDUCAT 10.3389/fc														6	BRIT J	ENGLISH:HYBRID	WILEY	
12	FANCHAFANCHAFANCHAFANONONY THIS AR OPEN UNPROGRA 10.1109/T														2	J SCI	EDU. SCI. E	ENGLISH:NA	SPRINGE
13	YANG W, 2020, YANG W, YANG, VALIMISIS PROGRAM EDUC UNBLOCK F 10.1111/bj																		
14	JAIPAL-J, 2020, JAIPAL-J, JAIPAL-J, ADEDOKE THE CUF BROCK 10.1007/s1																		
15	ESTEVE, 2020, ESTEVE, ESTEVE, ADELL J. AM/PUR UNIV JA COMPUT 10.28945/a																		
16	MUNOZ, 2020, MUNOZ-GARCIA, ALSINA, THE DEV UNIV SA CHILDH 10.3916/c																		
17	POU AV, 2020, POU A;C, POU, ALACKERMIN THE CRAMON COMPUT 10.3390/c																		
18	BERS M, 2020, BERS M;BERS, M ANONY BY ENG/TUFTS U ELEMEN 10.1016/j																		
19	SILVA R, 2020, SILVA R;SILVA, R DELGAD THERE K UNIV TR COMPUT 10.3390/ec																		
20	PIEADAPIEADAPIEADAPANONY THIS PAF UNIV LI COMPUT 10.25053/a																		
21	BERS M, 2020, BERS M;BERS, M ANONY THIS CH, TUFTS U NA 10.40189/																		
22	CHEN G, 2020, CHEN G;CHEN, GAHO AV BASED C UNIV MI COMPUT 10.1016/j																		
23	BURLES, 2020, BURLES, BURLES, ANONY AS COMIRORY M COMPUT 10.1109/T																		
24	TERROB, 2020, TERROB, TERROB AHO AV THIS AR UNIV LA COMPUT 10.1080/I																		
25	ALDEN I, 2020, ALDEN I, ALIMISIS TODAY S EUROPE, COMPUT 10.3390/c																		

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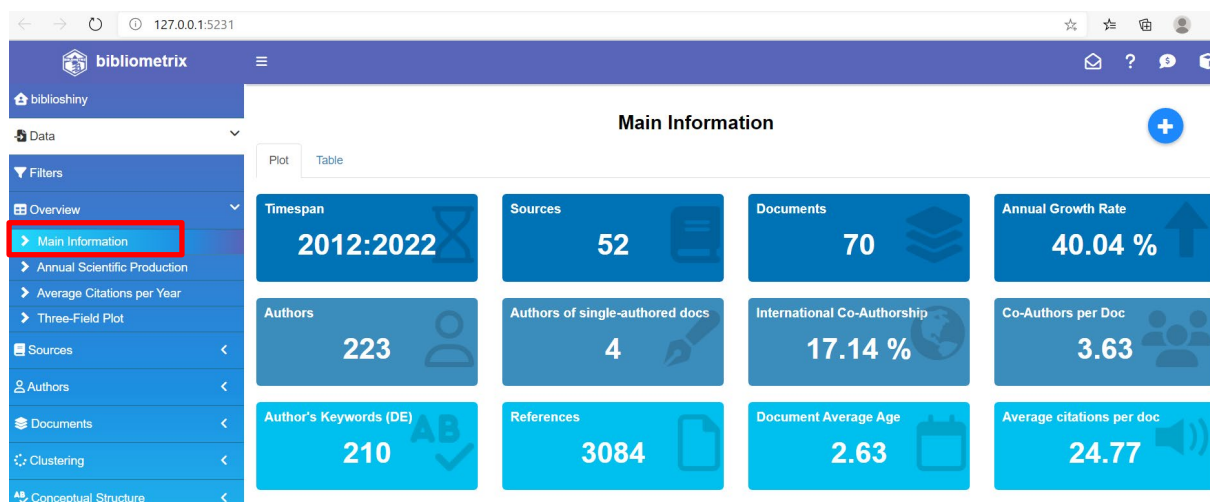


四、Bibliometrix 產生的圖表

以下列舉幾個畫面，可以參考文獻學習如何報導這些資訊。

<https://eclab.nkust.edu.tw/submitjim/volno.php?vol=30&no=4>

1. 下圖 Overview→Main Information，可以看到論文的基本資訊。



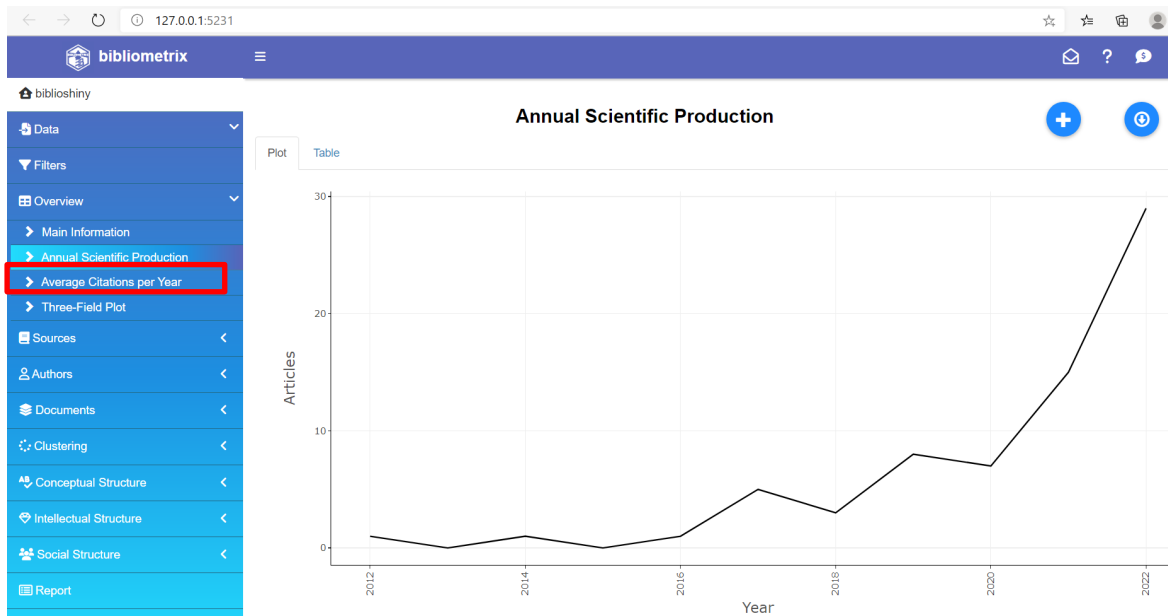
這些文章已發表在 52 個期刊，發表年份介於 2012-2022 之間，平均作品年份為 2.63 年，顯示大部分研究都在近幾年發表，屬於較為新興的研究主題。每篇論文的平均引用次數是用總引用次數除以論文總數來計算的，這些文章平均引用了 24.77 篇文章，引用的文章數頗為豐富。文章使用關鍵字數量總共 210 個，平均每篇文章使用 3 個關鍵字。每篇文章平均有 3.63 位作者，單一作者文章為 4 篇，作者合作指數(Collaboration Index, CI)則使用 Elango & Rajendran (2012)的公式 $CI = \text{作者總數} / \text{聯合論文總數}(\text{Total Authors of Multi Authored Papers} / \text{Multi Authored Papers})$ ，機器人於程式設計教育運算思維研究中 CI 值為 17.14，屬於高度合作的研究領域。

表 3：文獻基本資訊一覽

描述	結果
時間跨度	2012-2022
期刊來源	52
研究量	70
平均參考文獻引用量	24.77
參考文獻數	3084
關鍵字數量	210
單一作者文章數	4
平均作者數	3.63
作者合作指標	17.14

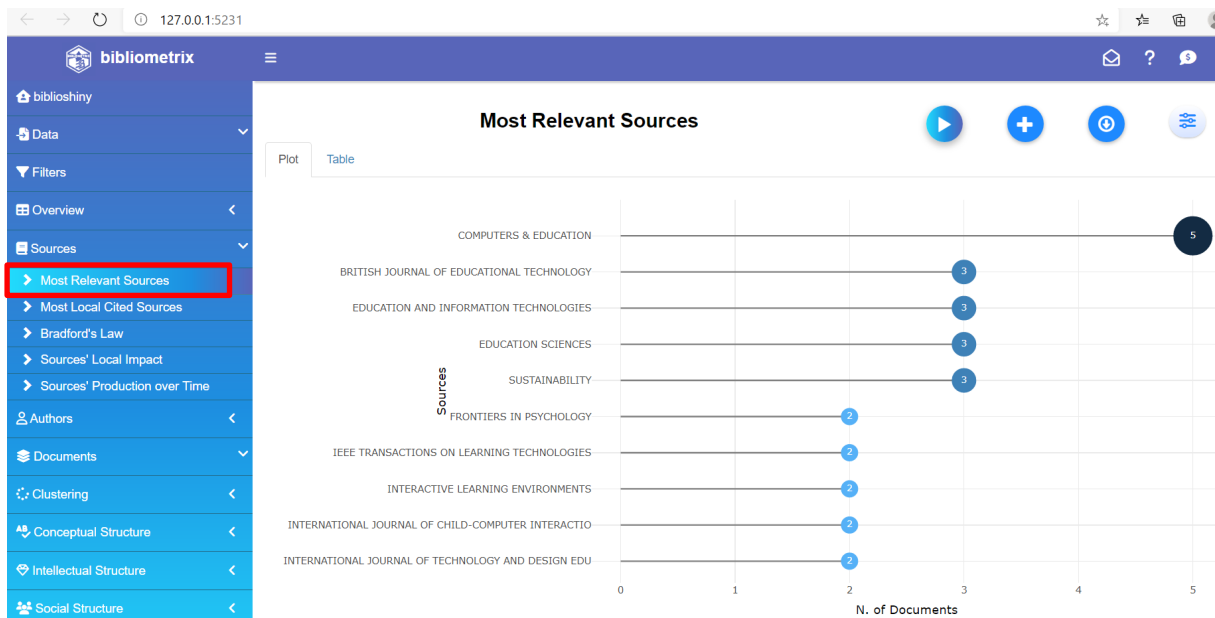
註：檢索設定 2006 至 2022 年，但 2012 年才有符合本研究選取標準的文章

2. 點選 Overview→Annual Scientific Production，顯示 2012 年至 2022 年使用機器人在程式設計教育運算思維研究的增長情況。2012 年到 2016 年期間該領域的研究並沒有明顯的增長，但是在 2016 年之後，研究呈現快速蓬勃的發展，研究複合年增長率 (Compound Annual Growth Rate) 為 40.04%，顯示此議題在近年受到重視，研究量正快速成長。

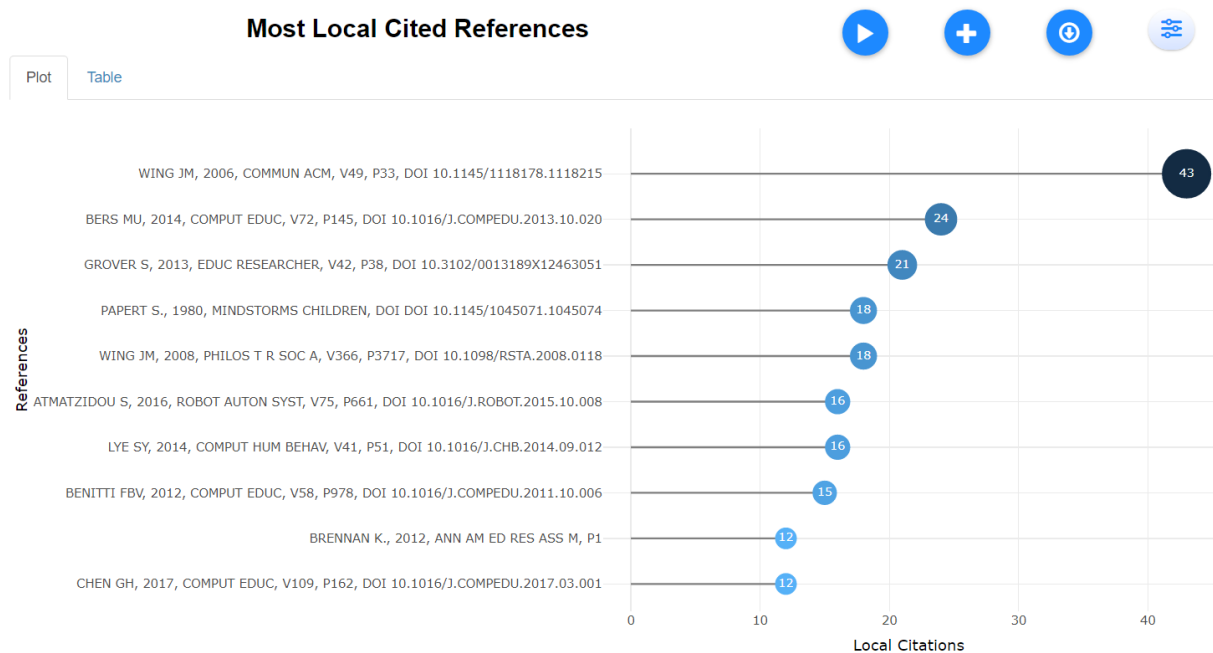


3. 點選 Sources→Most Relevant Sources

下圖為 2012 年到 2022 年最常發表的期刊，第一名為 Computers & Education、第二名為 British Journal of Educational Technology、第三名為 Education and Information Technologies、第四名為 Education Sciences、第五名為 Sustainability、第六名為 Frontiers in Psychology、第七名為 IEEE Transactions on Learning Technologies、第八名為 Interactive Learning Environments、第九名為 International Journal of Child-Computer Interaction 及第十名為 International Journal of Technology and Design Education。



4. 點選 Documents→Most Local Cited References，可以找到目前引用率最高的文章，預設是前 10 名。

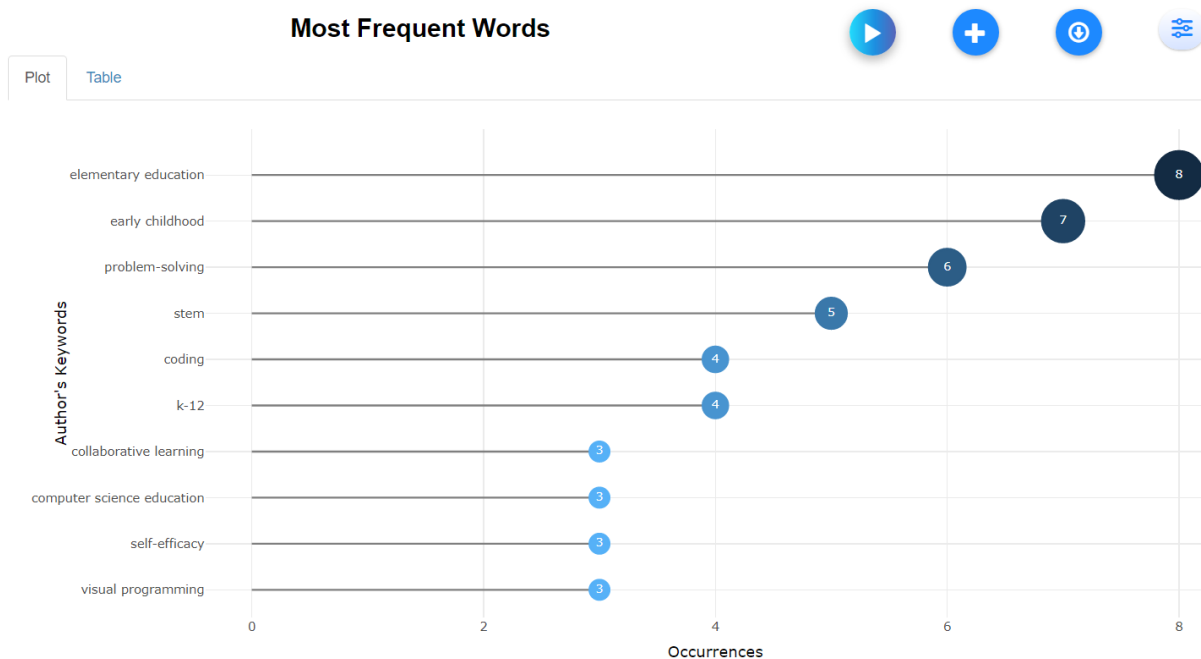


上圖顯示機器人程式設計教育運算思維研究參考文獻的引用情況。這些引用提供有關該領域最重要文獻的資訊。其中，Wing (2006)的研究特別受到關注，該研究強調運算思維的概念及其在現代社會的重要性。作者認為，運算思維不僅僅是電腦科學家的技能，而是一種普遍的態度和技能，每個人都應該學習。運算思維包括使用電腦科學的基本概念來解決問題、設計系統和理解人類行為.....


Most Local Cited Sources 是指在 70 篇文獻裡被引用最多的來源，而不是全部網路上文章的來源數最多的。

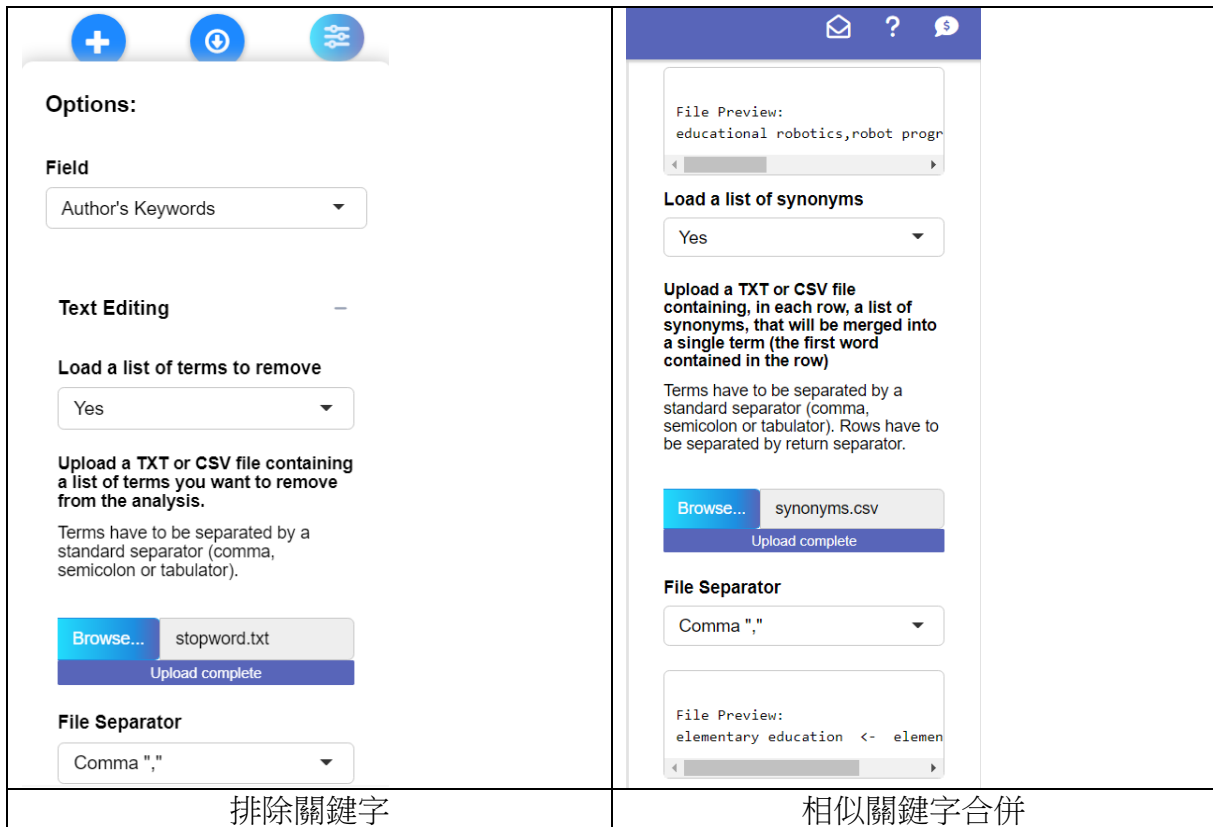
5. 點選 Documents→Most Frequent Words，然後在右上角的 Option 裡面的 Field 選擇 Author's keywords。需上傳兩個檔案，Text Editing 上傳排除的關鍵字的 stopwords.txt，在 Load a list of synonyms 上傳相似的關鍵字 synonyms.csv。

<p>排除關鍵字</p>	<p>stopword.txt</p>																								
	<table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>elementary education</td> <td>elementary school</td> <td></td> <td></td> </tr> <tr> <td>early childhood</td> <td>early childhood education</td> <td></td> <td></td> </tr> <tr> <td>k-12</td> <td>k-12 education</td> <td></td> <td></td> </tr> <tr> <td>problem-solving</td> <td>problem solving</td> <td></td> <td></td> </tr> <tr> <td>stem</td> <td>stem education</td> <td></td> <td></td> </tr> </tbody> </table>	A	B	C	D	elementary education	elementary school			early childhood	early childhood education			k-12	k-12 education			problem-solving	problem solving			stem	stem education		
A	B	C	D																						
elementary education	elementary school																								
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<p>相似關鍵字合併</p>	<p>synonyms.csv</p>																								



上圖呈現前 10 名使用關鍵字數量，可以發現最常使用的關鍵字依序為小學教育“**elementary education**”(8 次) 這指出部分研究主要聚焦在小學階段的教育，暗示這些研究的目標對象是小學生。兒童“**early childhood**”(7 次) 表明這些研究 關注於幼兒教育，強調在兒童早期階段培養運算思維的重要性。問題解決 “**problem-solving**”(6 次) 這顯示出研究的重心在於培養學生的問題解決能力，這 是運算思維的核心能力之一。科學、科技、工程和數學“**STEM**”(5 次) 表明研究 與 STEM 相關，這顯示出運算思維在這些學科中的應用和重要性。編碼“**coding**”(4 次) 指出研究將程式設計做為一種教育方法，用於培養運算思維。K-12 教育 “**K-12**”(4 次)強調研究範圍包括從幼兒園至 12 年級的整個學習階段。合作學習 “**collaborative learning**”(3 次)表明研究關注在通過合作和團隊學習來培養運算思 維。電腦科學教育“**computer science education**”(3 次) 指出研究與電腦科學教育 相關，強調在教育中引入電腦科學的重要性。自我效能“**self-efficacy**”(3 次) 表示 研究關注學生在運算思維方面的自我效能感。視覺化程式“**visual programming**”(3 次) ，指出部分研究採用視覺化程式設計工具，這種方法通常更適合初學者學習 程式語言。這些關鍵字反映研究對於培養運算思維在學齡前至小學階段學生中的 應用和重要性的關注。這也強調在教育中引入科技和程式設計以促進學習運算思 維的趨勢。

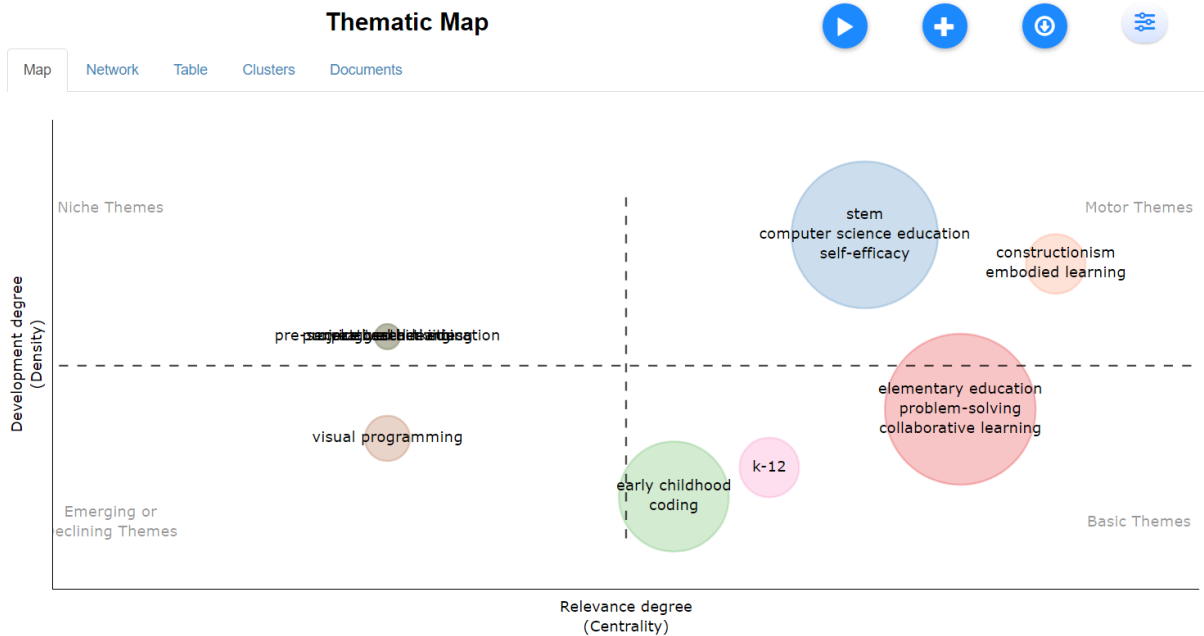
6. 點選 Conceptual Structure→Thematic Map，像上面關鍵字的排除關鍵字設定及同義詞設定，上傳 stopwords.txt 及 synonyms.csv，如下圖。接著再按下 ，就可以看到主題地圖了。



這裡可以看到集群的設定參數。也可以在文章中報導。例如：在本研究中，最小集群頻率（Min Cluster Frequency）和隨意遊走模型（WalkTrap）被用於設定集群，以識別主題集群。

Parameters —

Number of Words	Min Cluster Frequency (per thousand docs)
<input type="text" value="250"/>	<input type="text" value="5"/>
Number of Labels	Label size
<input type="text" value="3"/>	<input type="text" value="0.3"/>
Community Repulsion	Clustering Algorithm
<input type="text" value="0"/>	<input type="text" value="Walktrap"/>



本研究使用主題分析方法，通過分析作者的關鍵字集群，以及這些關鍵詞之間的相互聯繫，來確定研究的主題和重要性。主題分析是一種理解研究範圍的方法，它通過建立一個包含關鍵字和從標題或摘要中提取術語的文件術語矩陣，然後計算文件之間相似性來實現 (Aria, Misuraca, & Spano 2020)。這種方法可以識別強關聯的主題集群，每個集群對應一個研究主題，並通過主題地圖來呈現結果。主題分析將主題分為四個象限，根據中心性（主題之間的相關程度和重要性）和密度（主題之間的凝聚力和發展潛力）這兩個屬性。中心性和密度用於評估主題的重要性的發展水平。一個主題在主題網絡中與其他主題的相關性越高，它的中心性和重要性就越高，並且處於網絡的核心位置。同樣地，密度表示一個主題領域的集中度，即該主題的發展和內聚程度。

1. 右上象限 (Q1)：驅動主題 Q1 的結果顯示高中心性和高密度的主題，表示該主題在機器人程式設計教育運算思維研究中具有重要性且與整體相關性高。該主題又有良好的發展研究。
2. 左上象限 (Q2)：專業的主題或是小眾的主題。Q2 顯示低中心性和高密度的主題。機器人在程式設計教育和運算思維研究中的重要性和相關性相對較低，但高密度表示有一些研究專注於這些主題，通常是專業或小眾的主題。
3. 左下象限 (Q3)：新興或正要消失的主題。Q3 的分析顯示，有一個主題集群為視覺化程式(visual programming)，但其低中心性和低密度表明與整體文章的重要性的相關性相對較低。這表示機器人在程式設計教育和運算思維研究中可能處於發展較弱的主題之一(Aria et al. 2020)。
4. 右下象限 (Q4)：潛在主題 Q4 顯示高中心性和低密度的主題，突顯了機器人在程式設計教育中的運算思維研究的重要性的相關性。然而，主題集群之間的文章凝聚力較低，顯示該主題有重要性但發展不足，存在潛在的發展機會。

要將文章歸類在上述的哪一個象限時，可以先將記錄輸出，點選 Documents→Excel。

Thematic Map

Map
Network
Table
Clusters
Documents

Search:

Show all rows
Copy
CSV
Excel
PDF
Print

DOI	Authors	Title	Source	Year	TotalCitation	TCperYear	NTC	SR
10.1111/bjjet.13078	VALENTE J;CACEFFO R;BONACIN R;DOS R J;GONCALVES D;BARANAUSKAS M	EMBODIEDBASED ENVIRONMENT FOR KINDERGARTEN CHILDREN REVISITING CONSTRUCTIONIST IDEAS	BRITISH JOURNAL OF EDUCATIONAL TECHNOLOGY	2021	5	1.667	0.463	VALENTE J, 2021, BR J EDUC TECHN
10.1080/15391523.2022.2158146	KWON K;JEON M;ZHOU C;KIM K;BRUSH T	EMBODIED LEARNING FOR COMPUTATIONAL THINKING IN EARLY PRIMARY EDUCATION	JOURNAL OF RESEARCH ON TECHNOLOGY IN EDUCATION	2022	0	0.000	0.000	KWON K, 2022, RES TECHN EDUC
10.3916/C59-2019-06	MUNOZ-REPISO A;CABALLERO-GONZALEZ Y	ROBOTICS TO DEVELOP COMPUTATIONAL THINKING IN EARLY	COMUNICAR	2019	55	11.000	2.066	MUNOZ-REPI: A, 2019, COMI INICA

Thematic_Map_Documents.xlsx - Excel

DOI	Authors	Title	Source	Year	TotalCita	TCperYe	NTC	SR	early chi stem	element	project-l	construc	creative	k-12	visual pr	unplugg	pre-servi	Assigned_cluster	pageran
10.1111/	VALENTE J;CACEFFO R;BONACIN R;DOS R J;GONCALVES D;BARANAUSKAS M	EMBODIEDBASED ENVIRONMENT FOR KINDERGARTEN CHILDREN REVISITING CONSTRUCTIONIST IDEAS	BRITISH JOURNAL OF EDUCATIONAL TECHNOLOGY	2021	5	1.667	0.463	VALENTE J, 2021, BR J EDUC TECHN	0	0	0	1	0	0	0	0	0	0	0.016
10.1080/	KWON K;JEON M;ZHOU C;KIM K;BRUSH T	EMBODIED LEARNING FOR COMPUTATIONAL THINKING IN EARLY PRIMARY EDUCATION	JOURNAL OF RESEARCH ON TECHNOLOGY IN EDUCATION	2022	0	0	0	KWON K, 2022, RES TECHN EDUC	0	0	0.5	0	0.5	0	0	0	0	0	0
10.3916/	MUNOZ-REPISO A;CABALLERO-GONZALEZ Y	ROBOTICS TO DEVELOP COMPUTATIONAL THINKING IN EARLY	COMUNICAR	2019	55	11	2.066	MUNOZ-REPI: A, 2019, COMI INICA	0	0	0	0	0	1	0	0	0	0	0.009
10.1186/	HSU T;CHEN M	THE ENG RESEARC		2022	2	1	0.403	HSU T, 2022, THE ENG RESEARC	0	0	0	0	0	0	1	0	0	0	0.009
10.1016/	RELKIN E;DE R L;B	LEARNIN COMPUT		2021	44	14.667	4.074	RELKIN E, 2021, LEARNIN COMPUT	1	0	0	0	0	0	0	0	0	0	0.033
10.3390/	ALDEN D;TRAMON	COMPUT ROBOTIC		2020	5	1.25	0.211	ALDEN D, 2020, COMPUT ROBOTIC	0.556	0.444	0	0	0	0	0	0	0	0	0.029
10.1111/	YANG W;LUO H;S	TOWARE BRITISH		2022	3	1.5	0.604	YANG W, 2022, TOWARE BRITISH	1	0	0	0	0	0	0	0	0	0	0.022
10.3389/	GEROSA A;KOLESZ	EDUCATI FRONTIE		2022	2	1	0.403	GEROSA A, 2022, EDUCATI FRONTIE	1	0	0	0	0	0	0	0	0	0	0.022
10.1007/	HALL J;MCCORMI	MY CARS TECHTR		2022	2	1	0.403	HALL J, 2022, MY CARS TECHTR	1	0	0	0	0	0	0	0	0	0	0.022
10.12795	BERS M	CODING PIXEL-BI		2021	2	0.667	0.185	BERS M, 2021, CODING PIXEL-BI	1	0	0	0	0	0	0	0	0	0	0.033
10.1080/	TERRROBA M;RIBEI	OBSERVJ EUROPEJ		2022	1	0.5	0.201	TERRROBA M, 2022, OBSERVJ EUROPEJ	1	0	0	0	0	0	0	0	0	0	0.022
10.1016/	BERS M;FLANNER	COMPUT COMPUT		2014	387	38.7	1	BERS M, 2014, COMPUT COMPUT	0.186	0	0.814	0	0	0	0	0	0	0	0.055
10.1016/	HSU T;CHANG S;H	HOW TO COMPUT		2018	250	41.667	2.717	HSU T, 2018, HOW TO COMPUT	0	0	1	0	0	0	0	0	0	0	0.007
10.1007/	NOH J;LEE J	EFFECTS ETR&D-E		2020	60	15	2.53	NOH J, 2020, EFFECTS ETR&D-E	0	0	1	0	0	0	0	0	0	0	0.033
10.30935	DURAK H;YILMAZ	COMPUT CONTEM		2019	41	8.2	1.54	DURAK H, 2019, COMPUT CONTEM	0	0	1	0	0	0	0	0	0	0	0.018
10.1109/	SHIM J;KWON D;L	THE EFFE IEEE TRA		2017	31	4.429	0.406	SHIM J, 2017, THE EFFE IEEE TRA	0	0	1	0	0	0	0	0	0	0	0.045
10.1109/	EVRIPIDOU S;GEO	EDUCATI IEEE ACC		2020	28	7	1.181	EVRIPIDOU S, 2020, EDUCATI IEEE ACC	0	0	1	0	0	0	0	0	0	0	0.01
10.5944/	SPEZ L J;OTERO R	INTRODI RIED-REY		2021	20	6.667	1.852	SPEZ L J, 2021, INTRODI RIED-REY	0	0	1	0	0	0	0	0	0	0	0.027
10.3390/	DIAZ-LAUZURICA	COMPUT SUSTAIN		2019	16	3.2	0.601	DIAZ-LAUZURICA, 2019, COMPUT SUSTAIN	0	0	1	0	0	0	0	0	0	0	0.018
10.1016/	CHEVALIER M;GIA	THE ROL COMPUT		2022	10	5	2.014	CHEVALIER M, 2022, THE ROL COMPUT	0	0	1	0	0	0	0	0	0	0	0.037
10.3390/	SILVA R;FONSECA	FOSTERI EDUCATI		2021	3	1	0.278	SILVA R, 2021, FOSTERI EDUCATI	0	0	1	0	0	0	0	0	0	0	0.037
10.1109/	FANCHAMPS N;SL	THE EFFE IEEE TRA		2022	2	1	0.403	FANCHAMPS N, 2022, THE EFFE IEEE TRA	0	0	1	0	0	0	0	0	0	0	0.028
10.1080/	SUNG W;AHN J;BL	ELEMEN JOURNA		2022	1	0.5	0.201	SUNG W, 2022, ELEMEN JOURNA	0	0.296	0.704	0	0	0	0	0	0	0	0.061
NA	LEE L;CHEUNG T;A	CROSS INTERNA		2021	0	0	0	LEE L, 2021, CROSS INTERNA	0	0	0.5	0	0	0	0	0	0.5	0	0
10.1145/	WITHERSPOON E;	DEVELOF ACM TR		2017	80	11.429	1.047	WITHERSPOON E, 2017, DEVELOF ACM TR	0	0	0	0	0	0	1	0	0	0	0.01
10.1002/	INCE E;KOC M	THE CON COMPUT		2021	16	5.333	1.481	INCE E, 2021, THE CON COMPUT	0	0	0	0	0	0	1	0	0	0	0.01
10.1016/	SHAHIN M;GONSA	HOW SEI JOURNA		2022	6	3	1.208	SHAHIN M, 2022, HOW SEI JOURNA	0	0	0	0	0	0	1	0	0	0	0.01
10.3390/	PIEDADE J;DOROT	ON TEAC EDUCATI		2020	16	4	0.675	PIEDADE J, 2020, ON TEAC EDUCATI	0	0	0.25	0	0	0	0	0	0	0.75	0.021
10.25055	PIEDADE J	PRESERV EDUCAC		2021	6	2	0.556	PIEDADE J, 2021, PRESERV EDUCAC	0	0	0	0	0	0	0	0	0	1	0.004
10.3390/	CHIAZZESE G;ARRI	EDUCATI INFORM		2019	22	4.4	0.826	CHIAZZESE G, 2019, EDUCATI INFORM	0.333	0	0	0.667	0	0	0	0	0	0	0.016

要看四個象限的所有集群，點選 Table→Excel。可以輸出 words 和對應的標籤，用此檔去判斷集群的情況。

Thematic Map

Map Network **Table** Clusters Documents

Show all rows Copy CSV **Excel** PDF Print Search: _____

Occurrences	Words	Cluster	Cluster_Label	btw_centrality	clos_centrality	pagerank_centrality
All	All	All	All	All	All	All
8	elementary education	1	elementary education	3592.0999999999999	0.00326797385620915	0.02659260261885537
6	problem-solving	1	elementary education	2060	0.002659574468085106	0.01793216857796045
3	collaborative learning	1	elementary education	874	0.002016129032258064	0.01018502572411618
2	debugging	1	elementary education	1018.3333333333333	0.003048780487804878	0.007728433427842162
2	gender difference	1	elementary education	479.91666666666666	0.002506265664160401	0.00618636438898977
2	pedagogical issues	1	elementary education	230	0.002538071065989848	0.007084376063022517
2	programming profession	1	elementary education	770	0.00211864406779661	0.01013402376822216
5	stem	2	stem	1365	0.002386634844868735	0.01768931961575864
3	computer science education	2	stem	979.44999999999997	0.002590673575129534	0.008755006087396877
3	self-efficacy	2	stem	1230.6166666666666	0.003095975232198143	0.008838165059639209
2	algorithmic thinking	2	stem	510.88333333333334	0.002680965147453083	0.007935914925809896
2	lego wedo	2	stem	768.0833333333333	0.002557544757033248	0.007083756795667367

Thematic_Map_Terms (1).csv - Excel

檔案 常用 插入 頁面配置 公式 資料 校閱 檢視 說明 ACROBAT 告訴我您想做什麼

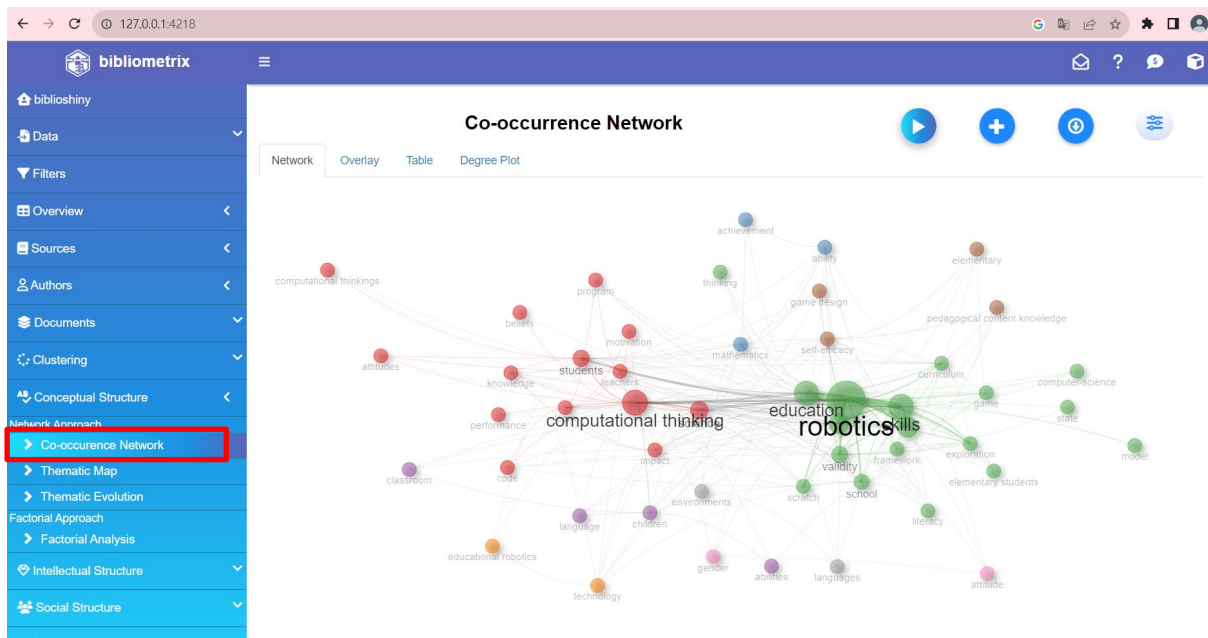
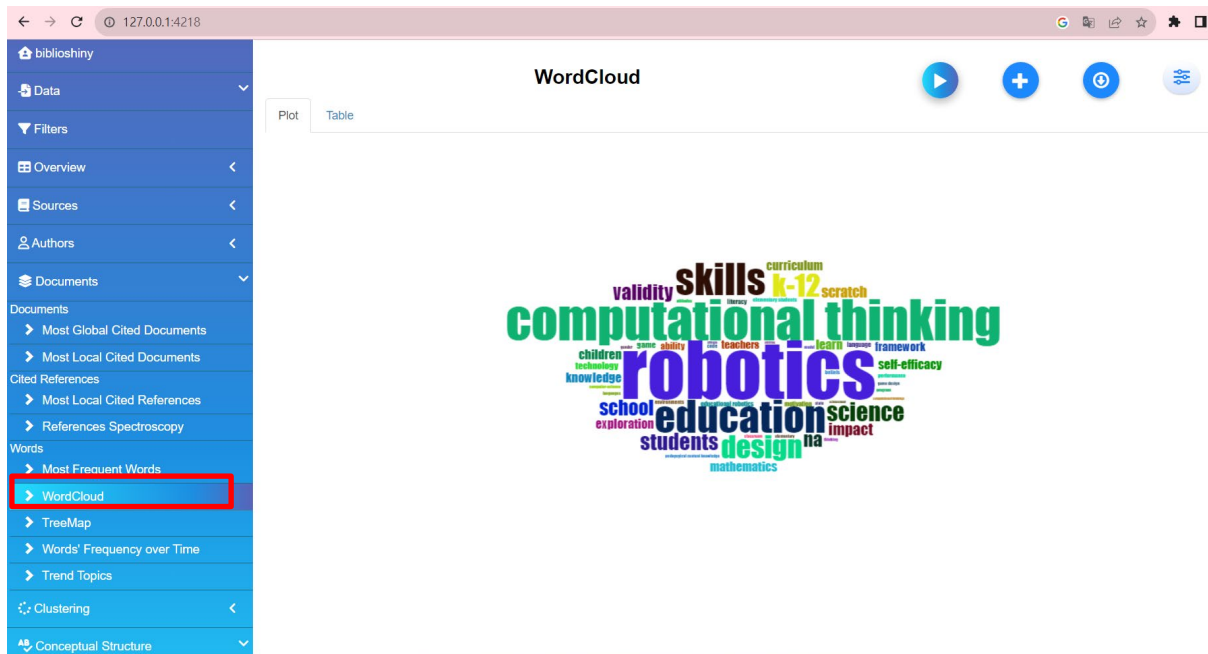
19

A	B	C	D	E	F	G	H	I
Occurrence	Words	Cluster	Cluster_Label	btw_centrality	clos_centrality	pagerank_centrality		
8	elementary education	1	elementary education	3592.1	0.003268	0.026593		
6	problem-solving	1	elementary education	2060	0.00266	0.017932		
3	collaborative learning	1	elementary education	874	0.002016	0.010185		
2	debugging	1	elementary education	1018.333	0.003049	0.007728		
2	gender difference	1	elementary education	479.9167	0.002506	0.006186		
2	pedagogical issues	1	elementary education	230	0.002538	0.007084		
2	programming profession	1	elementary education	770	0.002119	0.010134		
5	stem	2	stem	1365	0.002387	0.017689		
3	computer science education	2	stem	979.45	0.002591	0.008755		
3	self-efficacy	2	stem	1230.617	0.003096	0.008838		
2	algorithmic thinking	2	stem	510.8833	0.002681	0.007936		
2	lego wedo	2	stem	768.0833	0.002558	0.007084		
2	mental rotation	2	stem	624.5667	0.00277	0.007198		
2	programming education	2	stem	230	0.002028	0.006167		
2	science education	2	stem	768.95	0.002604	0.005854		
2	systematic review	2	stem	140.1667	0.002247	0.006019		
7	early childhood	3	early childhood	1699.633	0.002732	0.021521		
4	coding	3	early childhood	660.8667	0.002174	0.011321		
2	creative thinking	4	creative thinking	20	0.111111	0.009074		
2	unplugged activities	5	unplugged activities	9	0.166667	0.008842		
3	visual programming	6	visual programming	566	0.001667	0.010397		
4	k-12	7	k-12	457	0.002053	0.009617		
2	project-based learning	8	project-based learning	116	0.001745	0.004988		
2	pre-service teacher education	9	pre-service teacher education	116	0.002041	0.003567		
2	constructionism	10	constructionism	322.9167	0.002066	0.00836		
2	embodied learning	10	constructionism	310.9167	0.002045	0.007387		

第一個集群為 STEM，其集群關鍵字為 STEM、電腦科學教育(Computer science education)、自我效能(Self-efficacy)、算法思維(Algorithmic thinking)、樂高 WeDo(LEGO WeDo)、心理旋轉(Mental rotation)、科學教育 (Science education)、系統性回顧(Systematic review)。

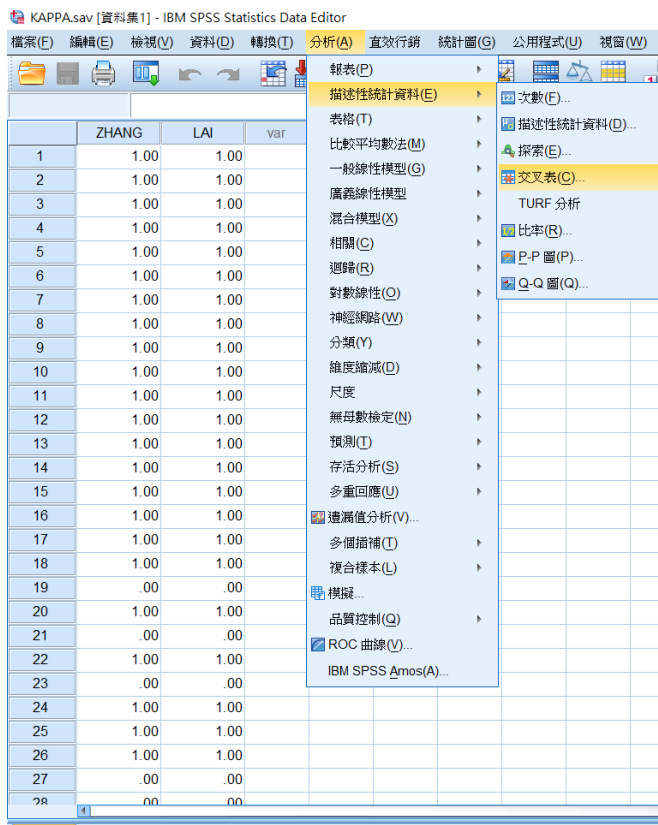
(因 programming education 是本研究的關鍵字，故排除)

其他還有不錯的圖形，如文字雲及共現網路。



五、評分者信度 kappa

若要計算兩位研究者的評分者信度 kappa，在 SPSS 輸入兩位作者的結果，並點選分析 → 描述性統計資料 → 交叉表，列及直欄分別放兩位作者的資料，再點選「統計資料」 → kappa 打勾。



報表如下
 ➔ 交叉表

[資料集1] D:\BIBLIO\20230904-20231115T000022Z-001\20230904\KAPPA.sav

觀察值處理摘要						
	觀察值					
	有效		遺漏		總計	
	N	百分比	N	百分比	N	百分比
ZHANG * LAI	170	100.0%	0	0.0%	170	100.0%

ZHANG*LAI 交叉列表

計數

		LAI		總計
		.00	1.00	
ZHANG	.00	95	6	101
	1.00	1	68	69
總計		96	74	170

對稱的測量

	數值	漸近標準錯誤 ^a	大約 T ^b	大約 顯著性
有效觀察值個數	170			

a. 未使用虛無假設。

b. 正在使用具有虛無假設的漸近標準誤。

兩位研究者的評分者信度 $\text{kappa} = 0.92$ ，有高度一致性，結果如下表所示。

表 2：研究者一致性檢定分析表

		A 研究者		
		不符合	符合	合計
B 研究者	不符合	95	6	101
	符合	1	68	69
	合計	96	74	170