

Conducting systematic reviews in the field of EdTech: Reflection and Praxis

EDEN PhD Symposium

18 June 2023

Participation



Workshop Materials



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Workshop schedule

1. Introduction, what are systematic reviews and why are they important?
2. Our backgrounds, benefits and challenges of reviews
3. What do we know about the field of EdTech so far? What are the gaps?
4. What are the steps of conducting a systematic review?
 - search strategy
 - screening and quality assessment
 - data extraction and synthesis
5. Software to assist with reviewing
6. Q&A session



What are SRs and why are they important?

- “Rather than looking at any study in isolation, we need to look at the body of evidence”¹



Galaxy Messier 101, Credit: NASA/JPL-Caltech/STScI

1. Nordenbo (2009, p. 22)
2. Gough et al. (2012, p. 2)

What are SRs and why are they important?

- “Rather than looking at any study in isolation, we need to look at the body of evidence”¹

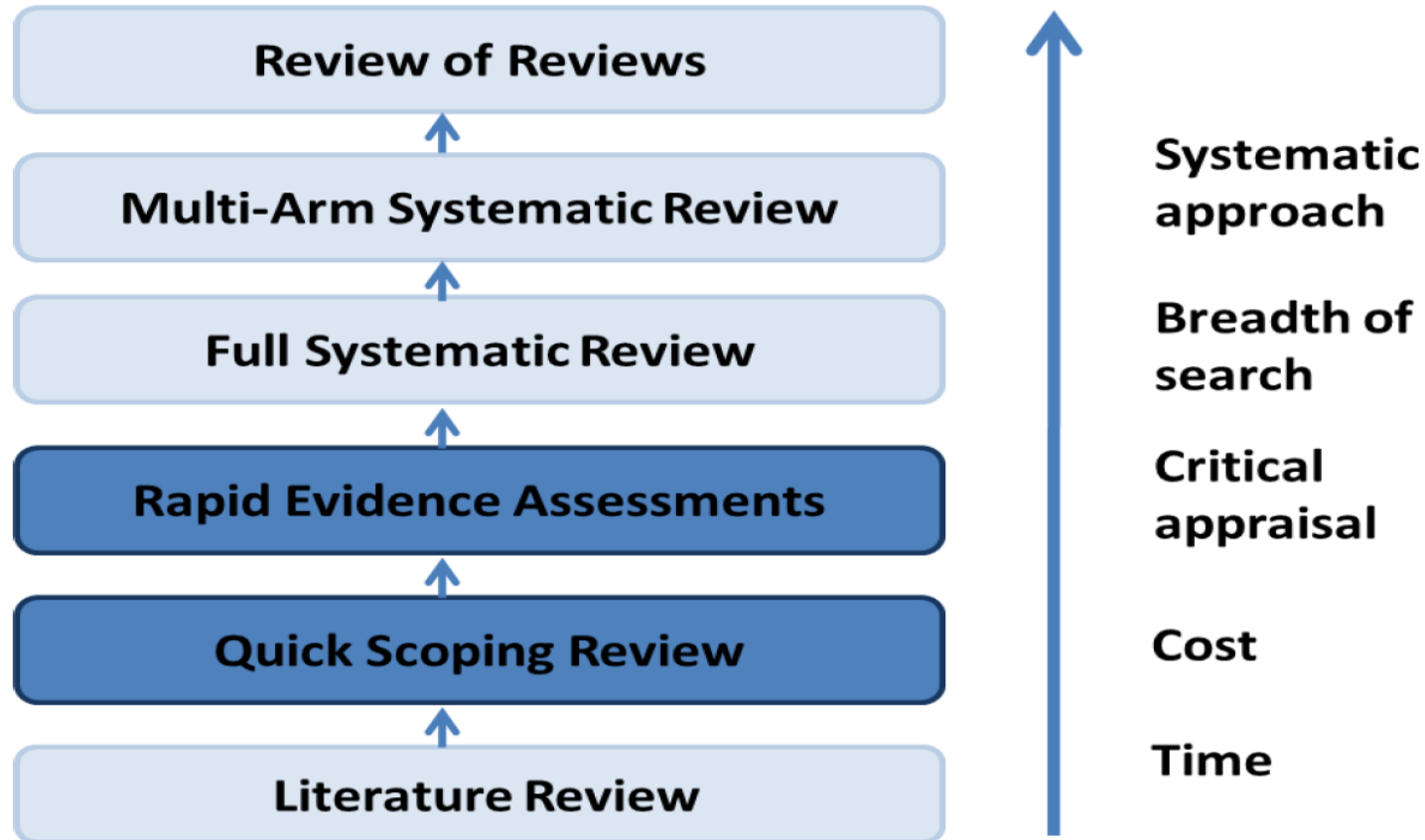
- "a review of research literature using systematic and explicit, accountable methods"²
 - Transparent and explicit
 - Replicable and updatable
 - Identify gaps, contradictions or (in)consistencies

1. Nordenbo (2009, p. 22)
2. Gough et al. (2012, p. 2)

Review Family

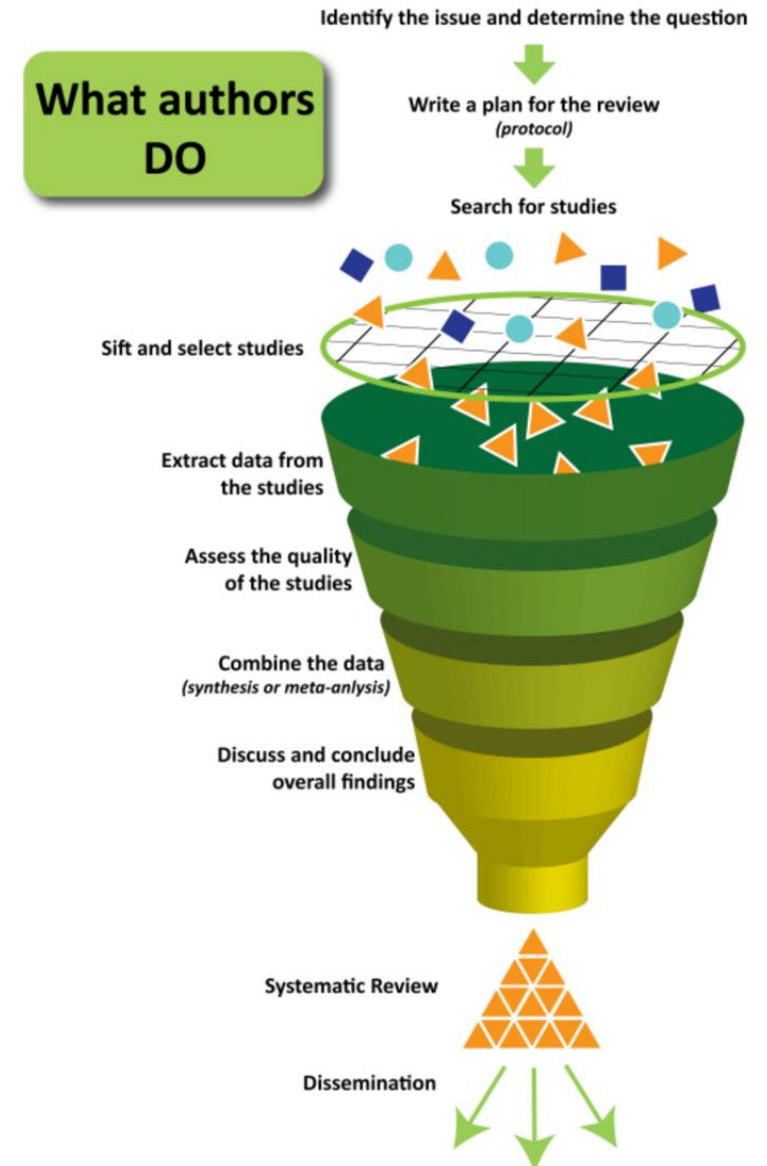
Traditional review family	Systematic review family	Review of review family	Rapid review family	Qualitative review family	Mixed methods review family	Purpose specific review family
<ul style="list-style-type: none">• Critical review• Integrative review• Narrative review• Narrative summary• State of the art review	<ul style="list-style-type: none">• Meta-analysis• Systematic review	<ul style="list-style-type: none">• Review of reviews• Umbrella review	<ul style="list-style-type: none">• Rapid reviews• Rapid evidence assessment• Rapid realist synthesis	<ul style="list-style-type: none">• Qualitative evidence synthesis• Qualitative meta-synthesis• Meta-Ethnography	<ul style="list-style-type: none">• Mixed methods synthesis• Narrative synthesis	<ul style="list-style-type: none">• Content analysis• Scoping review• Mapping review

What are SRs and why are they important?



Systematic review process

- Review question and conceptual framework
- Search strategy: search string and selection criteria
- Study screening
 - ❑ Title & Abstract
- Study retrieval
- Screen on full text
- Data Extraction
- Quality assessment
- Synthesis
- Report



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Dr Melissa Bond

- Born and raised in South Australia
- High school teacher (10 years)
 - > German, Humanities, IT, English, Drama, Music...



My background

- Research Associate
 - > CvO Universität Oldenburg, 2017-2020
 - > ActiveLearn project
 - > PhD, 2020 – *Facilitating student engagement through educational technology: Current research, practices and perspectives*



My background

- EPPI-Reviewer Support Officer
 - > University College London
 - > since Feb 2020
- Systematic & mapping reviews
 - > T&L during COVID-19
 - > Methodological support



Current positions

- Research Fellow, EPPI Centre (UCL, UK)
- Adjunct Associate Professor (University of Stavanger, Norway)
- Research Fellow (National Institute of Teaching, UK)

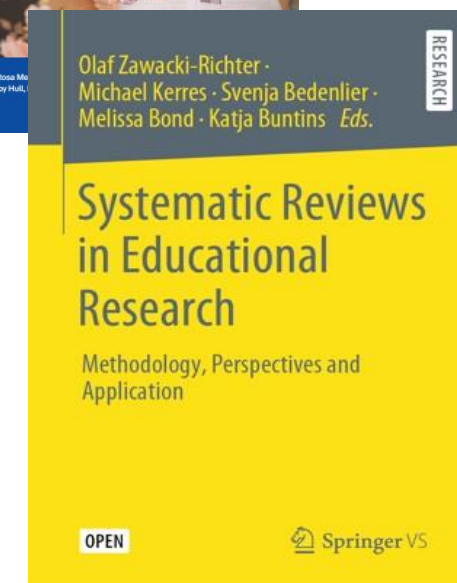
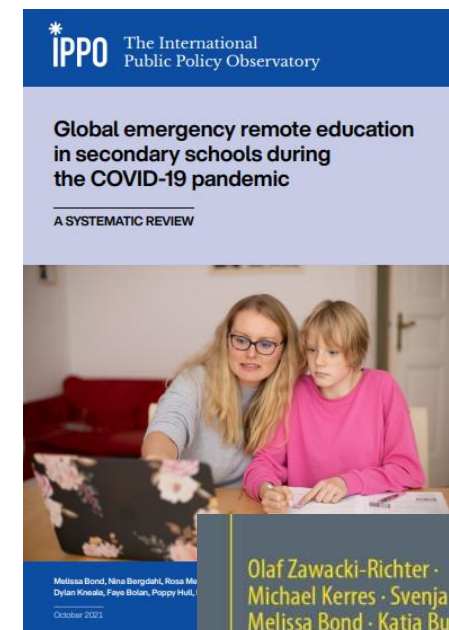


Evidence synthesis

- [Student engagement and educational technology in higher education](#)
- [Student engagement and the flipped learning approach \(K-12\)](#)
- [Artificial Intelligence in Higher Education](#)
- [Systematic Reviews in Educational Research \(co editor\)](#)
- [COVID-19 studies on teaching and learning in K-12 \(rapid review\)](#)
- [COVID-19 studies on teaching and learning in higher education](#)
- [Teaching and learning in secondary schools during COVID-19](#)

Current reviews include...

- Artificial intelligence in education – meta review
- Language bias & methodological approaches to evidence synthesis – meta review
- Mothers undertaking doctoral studies – systematic review
- Disabled pre-service teachers – scoping review
- Programming and computational thinking in K-12 – meta review



Benefits

Search and retrieval skills

Exposure to many research
& writing styles

Broad understanding of a
topic

Identification of research
gaps

Challenges

Understanding of method

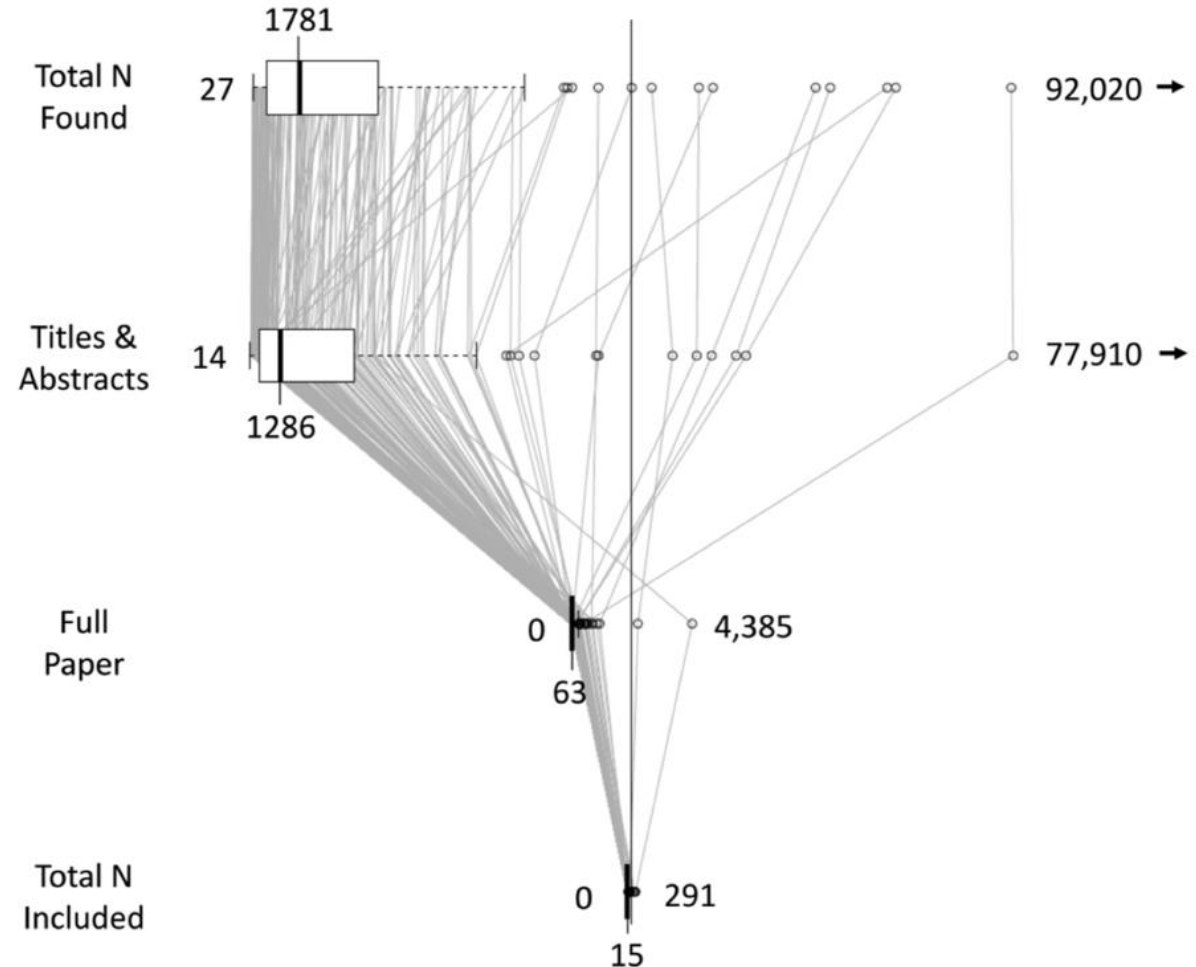
Software

Scope and retrieval

Resources (time and people)

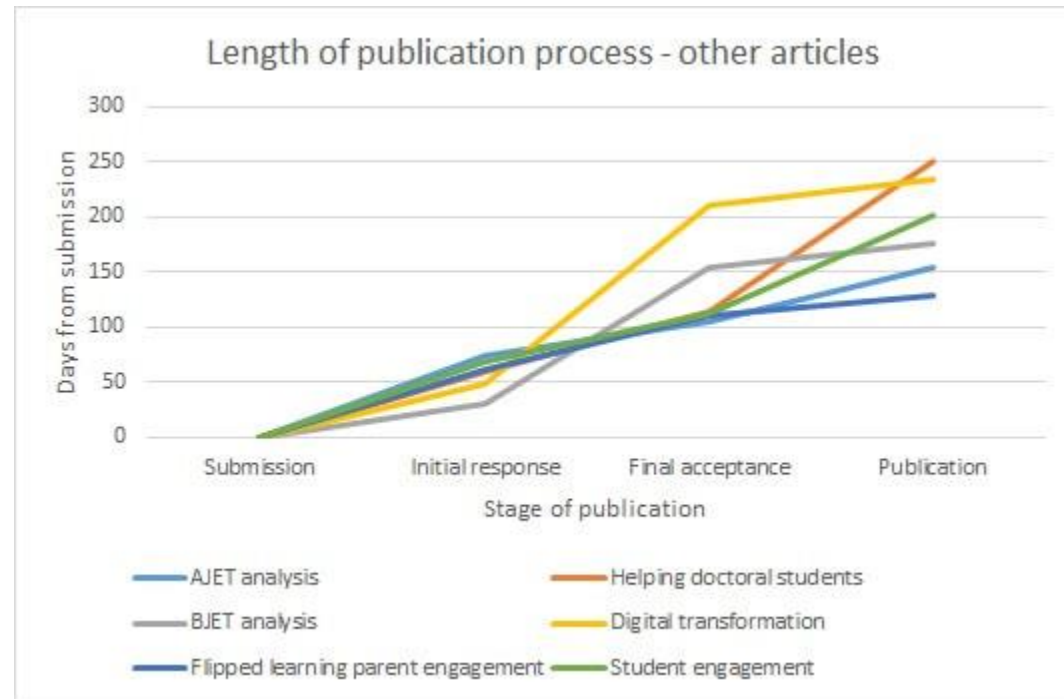
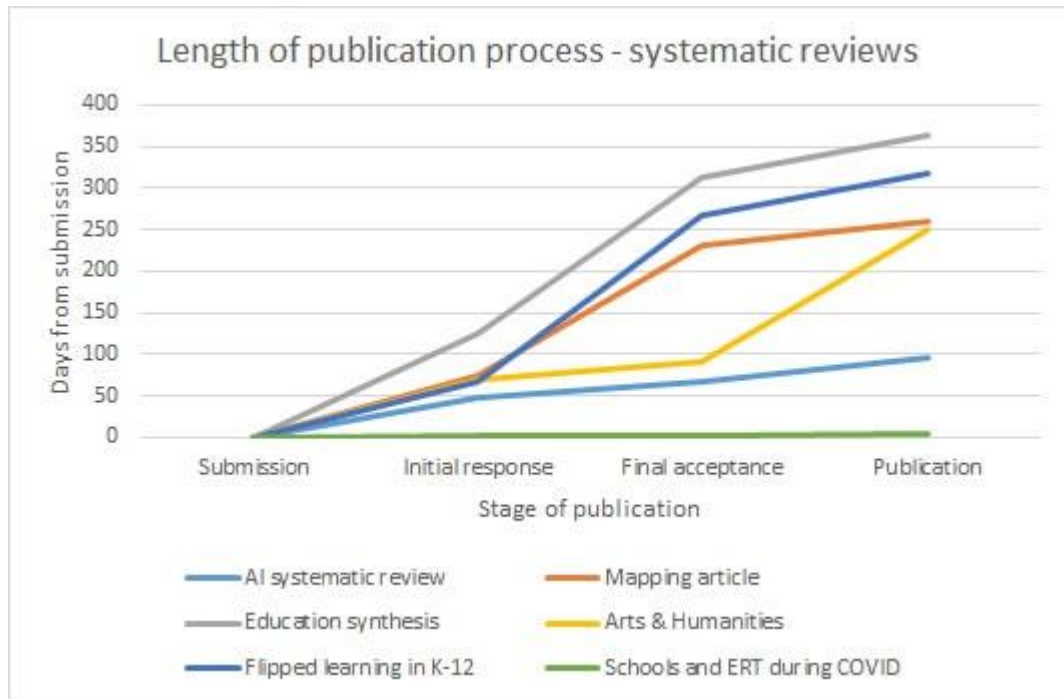
Systematic reviews as a time and labour-consuming undertaking

- average of 67 (SD = 31) weeks to conduct and publish a review
- reviews that reported funding took longer (42 vs 26 weeks) and involved more team members (6.8 vs 4.8 persons) than reviews that reported no funding
- final average yield rate below 3%



	Tai et al.	Bedenlier et al.	Lo et al.	Goagoses & Koglin	Zawacki-Richter et al.
Topic	conceptualization and measurement of student engagement	student engagement and educational technology in higher education	flipped and video-based learning in various subject areas in higher education	social goals and academic success	AI in higher education
Duration	18 months	24 months	1 – 4 months	11 months	9 months
No of team members	4 authors, 1 research assistant	5 authors, 2 research assistants	1 – 3 authors	2 authors	3 authors, 1 research assistant
Initial references	4,192	77,508	936 – 4,053	2,270	2,656
Final references	186	243	5 – 61	26	146
Yield rate	4.44 %	0.31 %	0.05 – 1.51 %	1.14 %	5.50 %
Databases searched	PsycINFO, ERIC, Education Source, and Academic Search Complete were accessed via Ebscohost, Scopus, Web of Science	ERIC, Web of Science, PsychINFO, and SCOPUS	Academic Search Complete, TOC Premier, and ERIC, PubMed, PsycINFO, CINAHL Plus, and British Nursing Index	Web of Science Core Collection, Scopus, and PsychINFO	EBSCO Education Source, Web of Science, and Scopus

Are systematic reviews ‘harder’ to get published? ([blog](#))



	Submission to initial response	Initial response to final acceptance	Final acceptance to publication	Entire process
Minimum	3 days (outlier)	1 day	1 day	4 days
Maximum	124 days	201 days	159 days	363 days
Average	64 days (76 removing outlier)	99 days (118 removing outlier)	52 days (63 removing outlier)	215 days (257 removing outlier)

	Submission to initial response	Initial response to final acceptance	Final acceptance to publication	Entire process
Minimum	30 days	31 days	17 days	128 days
Maximum	75 days	163 days	136 days	251 days
Average	57 days	78 days	56 days	191 days

On average, 19 days longer to receive an initial response to a systematic review article, and 40 days longer to final acceptance, with the overall process taking 66 days longer on average for the entire publication process.

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Before:

- Masters in Curriculum and Instruction
- English Lecturer & Curriculum Developer for six years



Image credit:
<https://www.whereig.com/turkey/ankara-location-map.html>

Present:

- PhD candidate
- Research Associate
- COER Coordinator
 - <https://uol.de/coer>



Image credit:
<https://ontheworldmap.com/germany/city/oldenburg/>

- **Thesis:**
 - Student Support in Digital Higher Education
 - Supervisor: Prof. Dr. Olaf Zawacki-Richter
- **Interests:** Dropout, proactive support mechanisms, AI supported support, digital feedback, online communities
- **Teaching:**
 - Digital Learning Materials: Design, Development & Evaluation
 - Systematic Reviews in Educational Technology
 - OTL: Mentor
 - Design of TEL Environments
 - International and Transnational Educational Issues in Higher Education

Umbrella Review in ODDE

Olaf Zawacki-Richter,
Berrin Cefa Sari, John Y. H. Bai

EDEN Conference (Dublin), Ireland
June 18, 2023



Center for Open Education Research

Umbrella Reviews

"However, as systematic reviews become more plentiful, there is the potential for greater use of such overarching reviews as a mechanism for aggregating findings from several reviews that address specific questions." (Grant & Booth, 2009, p. 103)

Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies: A typology of reviews. *Health Information & Libraries Journal*, 26(2), 91–108. <https://doi.org/10.1111/j.1471-1842.2009.00848.x>

Olaf Zawacki-Richter ·
Michael Kerres · Svenja Bedenlier ·
Melissa Bond · Katja Buntins *Hrsg.*

RESEARCH

Systematic Reviews in Educational Research

Methodology, Perspectives and
Application

OPEN

 Springer VS

<http://link.springer.com/10.1007/978-3-658-27602-7>

Aims of the Umbrella Review

- identify best practices of SR in ODDE
- develop a quality index for SR in ODDE
- compare SR quality between journal groups (scope and impact)
- provide an overview of quality standards/tools
- explore major topics covered in the SR



umbrella *mapping* review that aims to provide an overview of the systematic review landscape in ODDE

ODDE

We conceptualize ODDE as an overarching term to refer to all kinds of learning and teaching processes in which knowledge and skill base of educational technology, digital media, and tools are used to present and deliver content, as well as facilitate and support communication, interaction, collaboration, assessment, and evaluation. Thus, ODDE is not monolithic in form. It includes various types, from technology-enhanced education, to flipped learning and blended learning, and to fully online education. (p. 6)

Zawacki-Richter, O., & Jung, I. (2022). Shaping the Field of Open, Distance, and Digital Education: An Introduction. In *Handbook of Open, Distance and Digital Education* (pp. 3–12). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-0351-9_94-1

Olaf Zawacki-Richter
Insung Jung
Editors

Handbook of Open, Distance and Digital Education

OPEN ACCESS

 Springer

<https://link.springer.com/referencework/10.1007/978-981-19-0351-9>

Search Strategy

Table 1: Search string

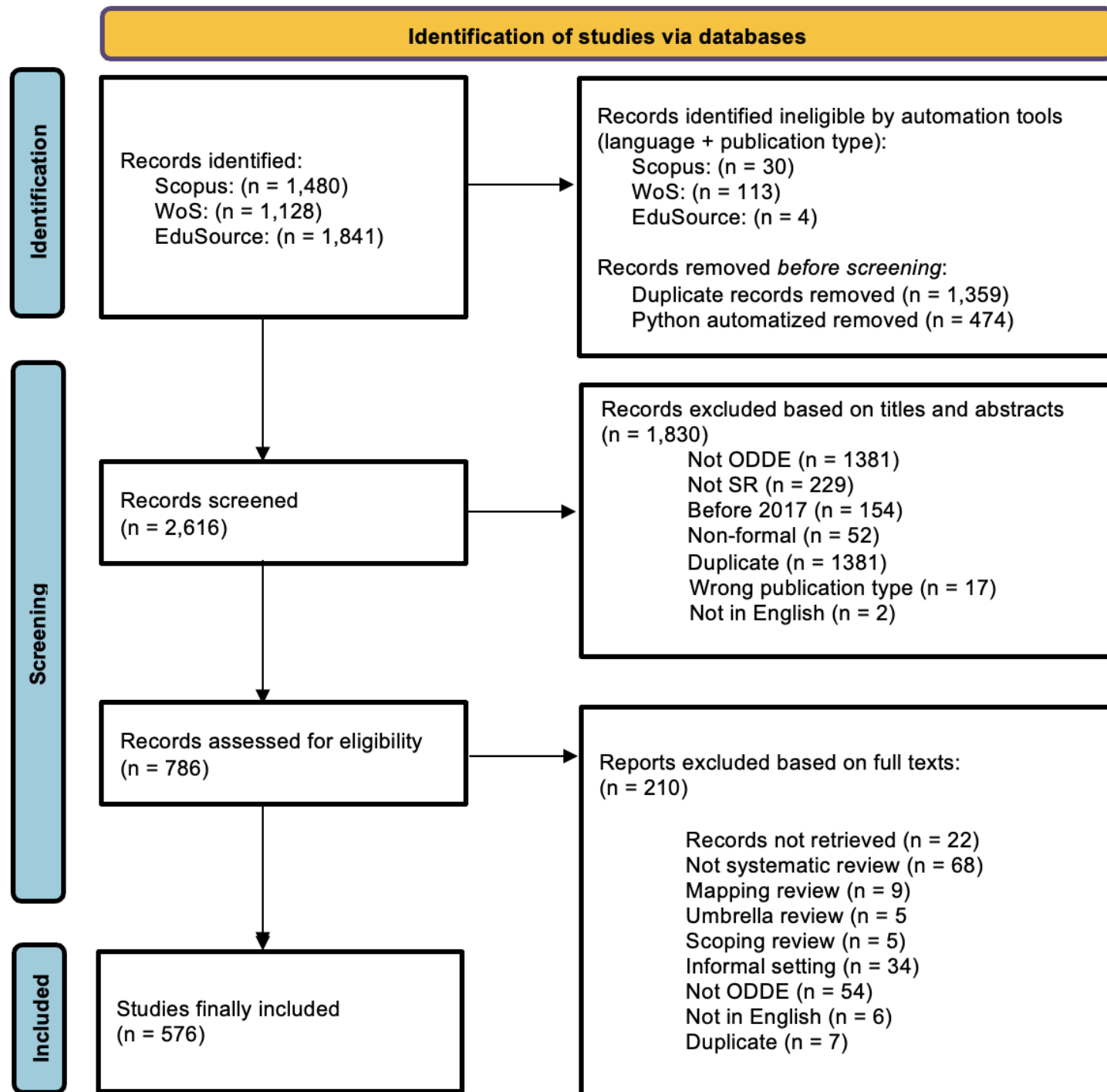
Topic	Search terms
Context	(distan* OR online OR open OR technology-enhanc* OR digital) W/3 (educat* OR learn* OR teach*)
AND	
Review type	systematic W/2 review

Table 2: Inclusion and exclusion criteria

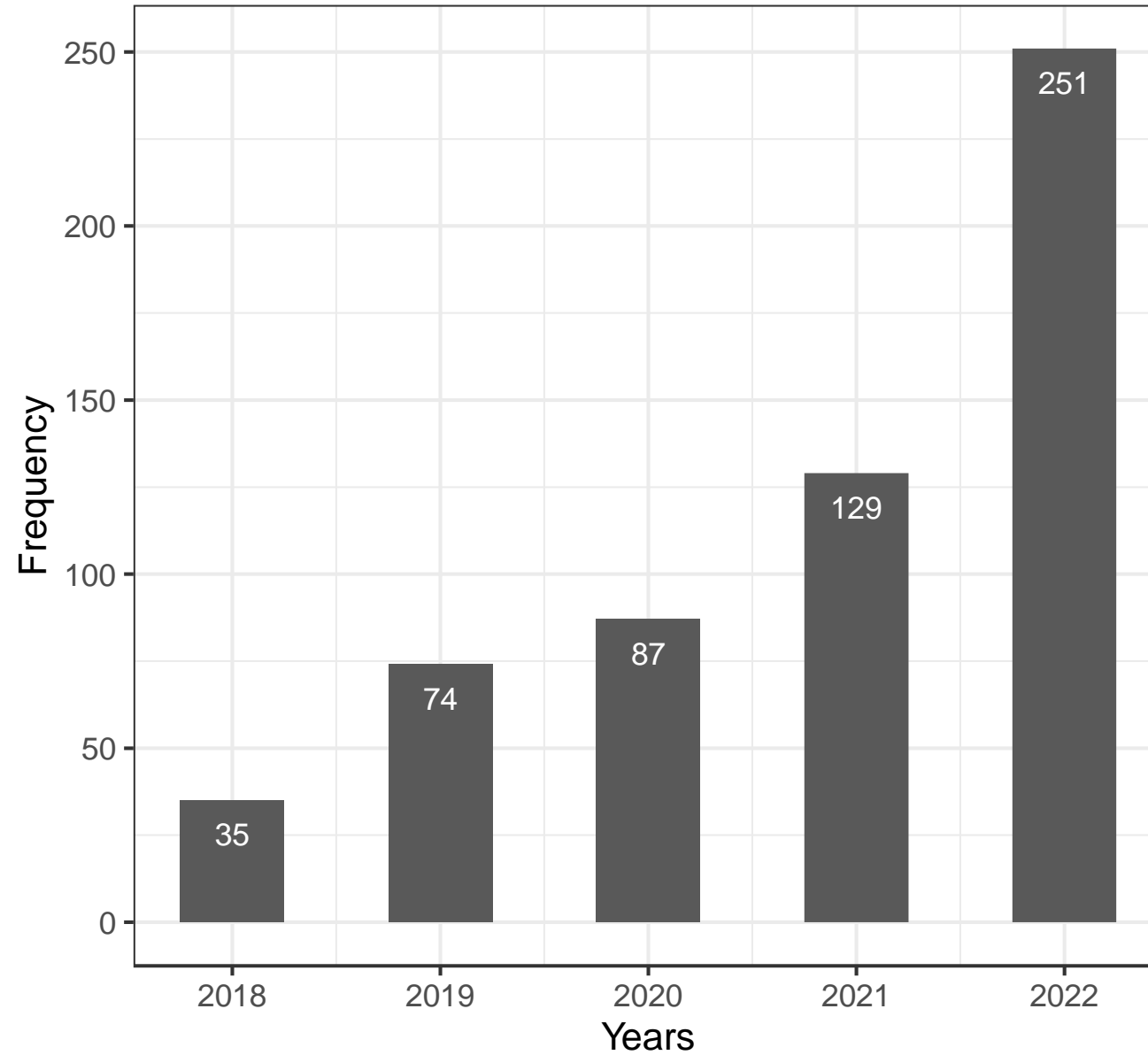
Criteria	Inclusion	Exclusion
Publication year	2018 – 2022	before 2018
Language	English	Not in English
Education level	Any level in ODDE, including K-12, HE, LLL, TVET	Not ODDE, informal, non-formal
Methodology	Systematic reviews*	Non-systematic reviews
Publication type	Peer-reviewed academic journal articles indexed in Scopus, WoS, and Education Source	Not a journal article (e.g., books, editorials, notes)

* Papers that claim to conduct systematic review in title or abstract have all been included.

PRISMA



Systematic Reviews per Year



Journals (N = 260)

Table 3: Number of included articles by journal

Rank	Journal	n
1	Computers & Education	27
	Education & Information Technologies	27
2	Sustainability (Switzerland)	19
3	Interactive Learning Environments	14
	Journal of Medical Internet Research	14
4	Education Sciences	12
5	Nurse Education Today	11
6	British Journal of Educational Technology	10
	Journal of Computer Assisted Learning	10
7	Australasian Journal of Educational Technology	9
	International Journal of Emerging Technologies in Learning	9
8	BMC Medical Education	8
	Int. Journal of Educational Technology in Higher Education	8
9	IEEE Access	7
	Journal of Research on Technology in Education	7
10	Applied Sciences (Switzerland)	6
	Computer Assisted Language Learning	6
	Turkish Online Journal of Distance Education	6
11	Educational Research Review	5
	Frontiers in Psychology	5
	International Review of Research in Open & Distributed Learning	5
	Medical Education	5
	Nurse Education in Practice	5
	Technology, Knowledge and Learning	5
	236 other journals	336
Total		576

Countries (N = 70)

Rank	Country	n	Cum %	Rank	Country	n	Cum %
1	China	58	10.1	14	Netherlands	9	75.3
2	USA	49	18.6		New Zealand	9	76.9
3	Spain	37	25.0	15	Finland	7	78.1
4	Malaysia	35	31.1		Norway	7	79.3
5	UK	32	36.6		Pakistan	7	80.6
6	Australia	31	42.0	16	Belgium	6	81.6
7	Iran	19	45.3		South Korea	6	82.6
	Turkey	19	48.6		South Africa	6	83.7
8	Canada	18	51.7		UAE	6	84.7
	Germany	18	54.9	17	France	5	85.6
	Singapore	18	58.0		Oman	5	86.5
9	India	17	60.9	18	Mexico	4	87.2
	Taiwan	17	63.9		Cyprus	4	87.8
10	Saudi Arabia	14	66.3		Greece	4	88.5
11	Indonesia	12	68.4		Thailand	4	89.2
12	Brazil	11	70.3				
13	Colombia	10	72.0		other	62	100.00
	Portugal	10	73.8				

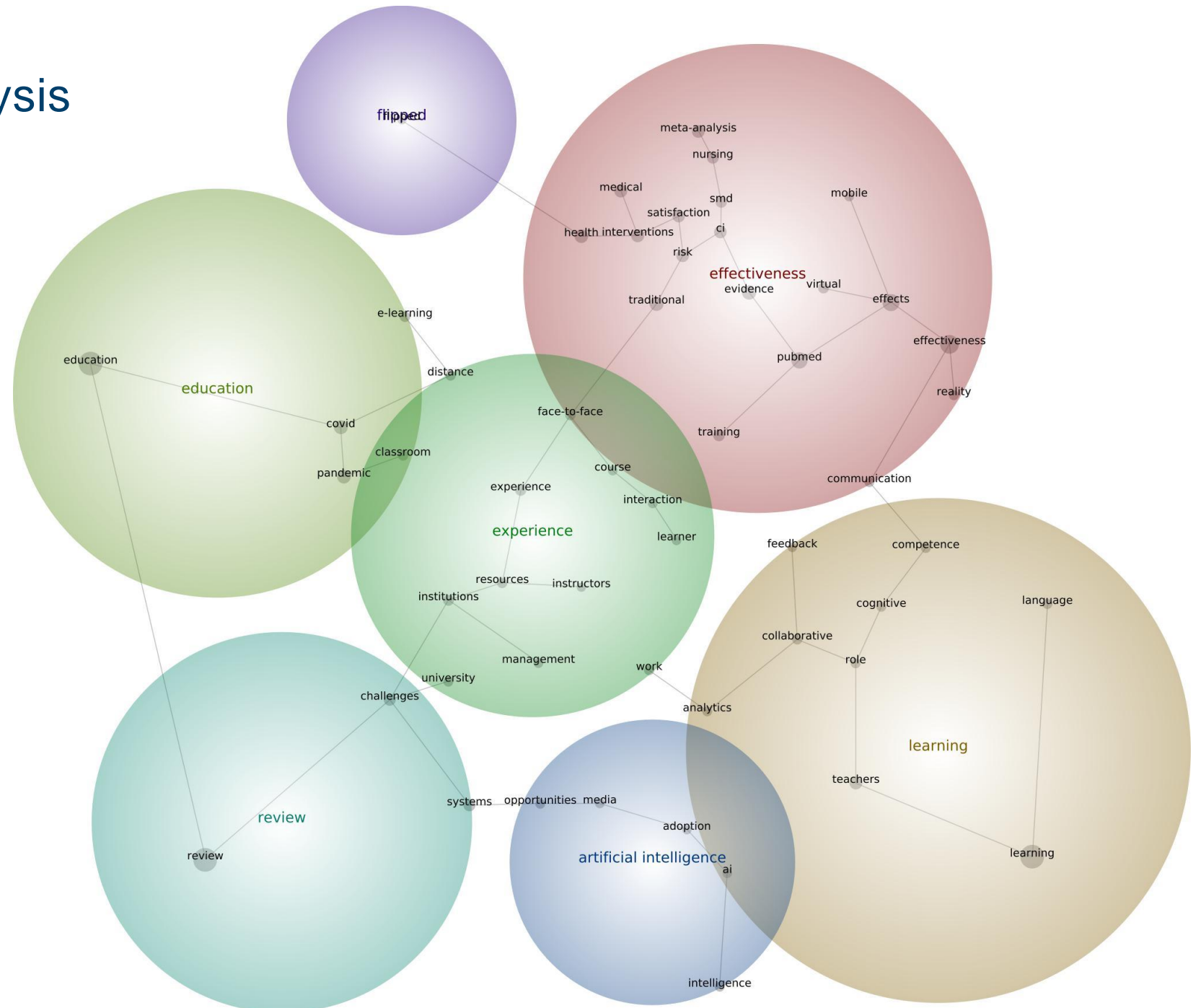
Some descriptive results

- Mean no. of authors = 3.6 ($SD = 2.2$) – work in a team!
- Mean no. of databases = 4.5 ($SD = 3.2$), max = 35 (!)
- Median no. of finally included records = 33.5, max = 1986, min = 0 (!!!)
- Yield rate: Mean = 14.7 %, Median = 6.5 %

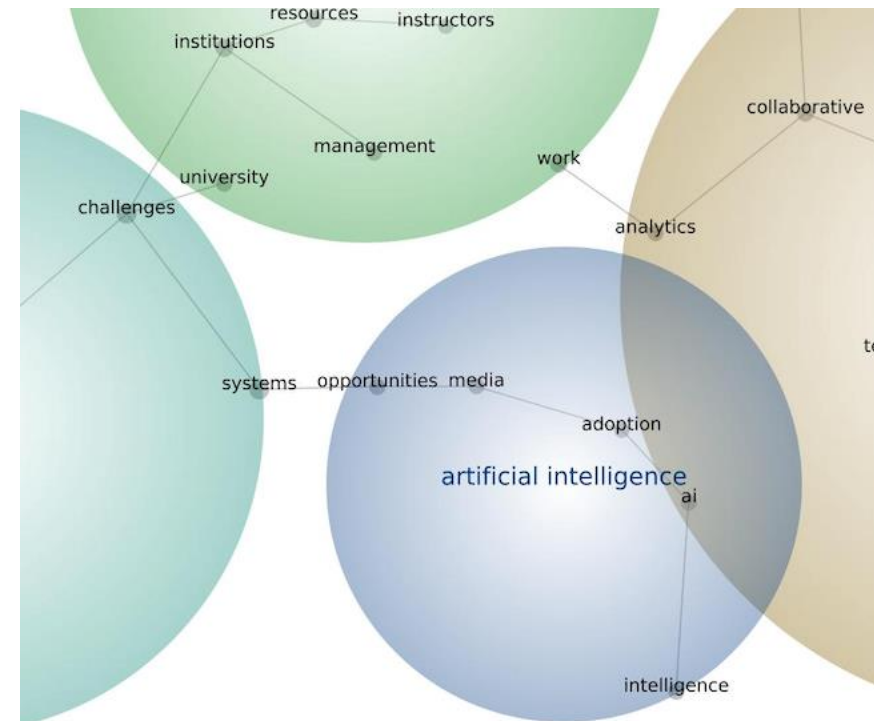
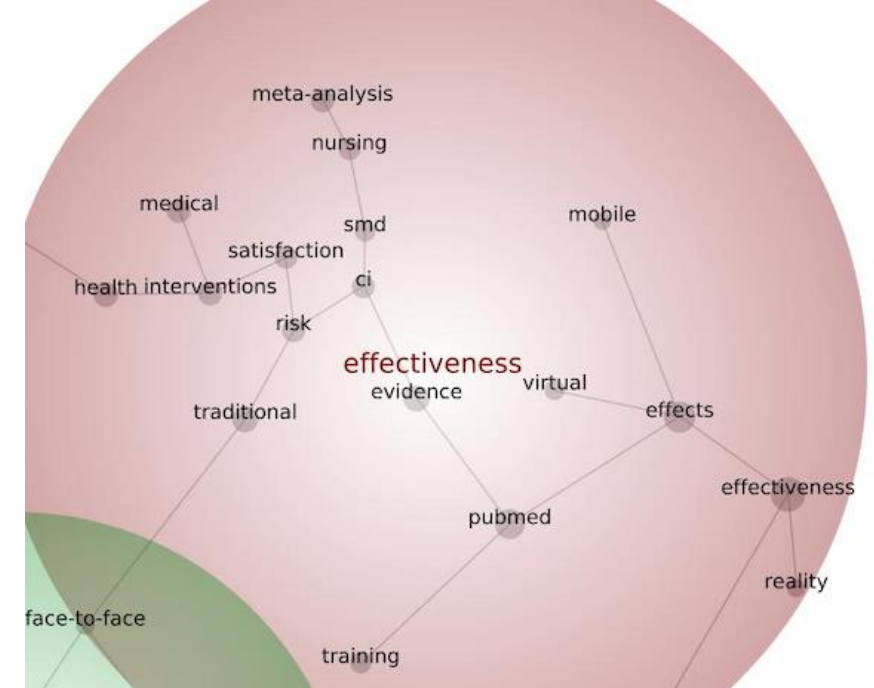
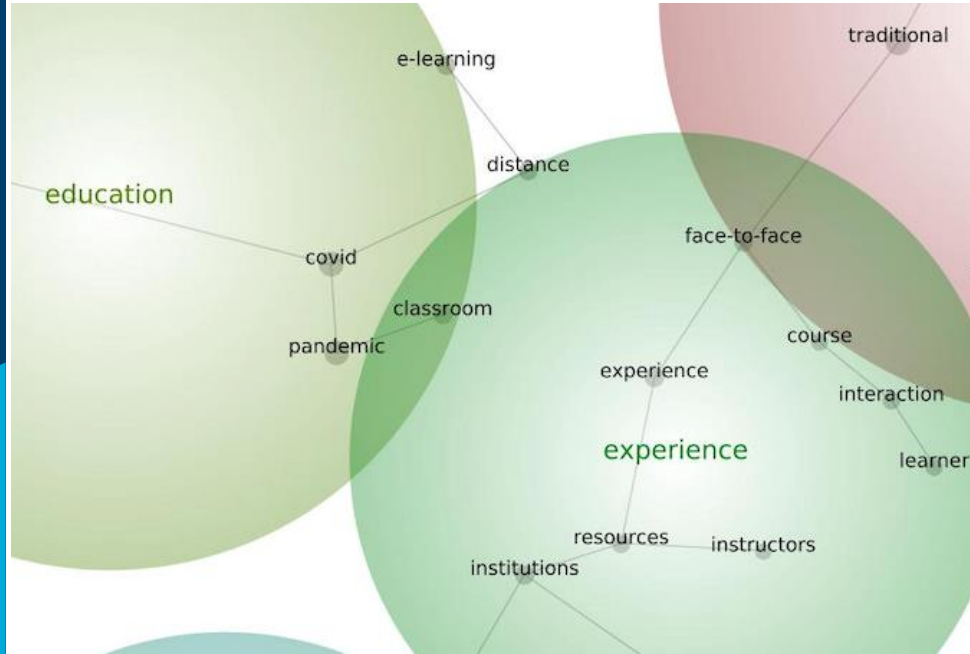


Stracke, C. M. (2019). Quality frameworks and learning design for open education. *International Review of Research in Open and Distance Learning*, 20(2), 180–203. <https://doi.org/10.19173/irrodl.v20i2.4213>

Content analysis



Content analysis



Systematic Review Quality Index Score (QIS)

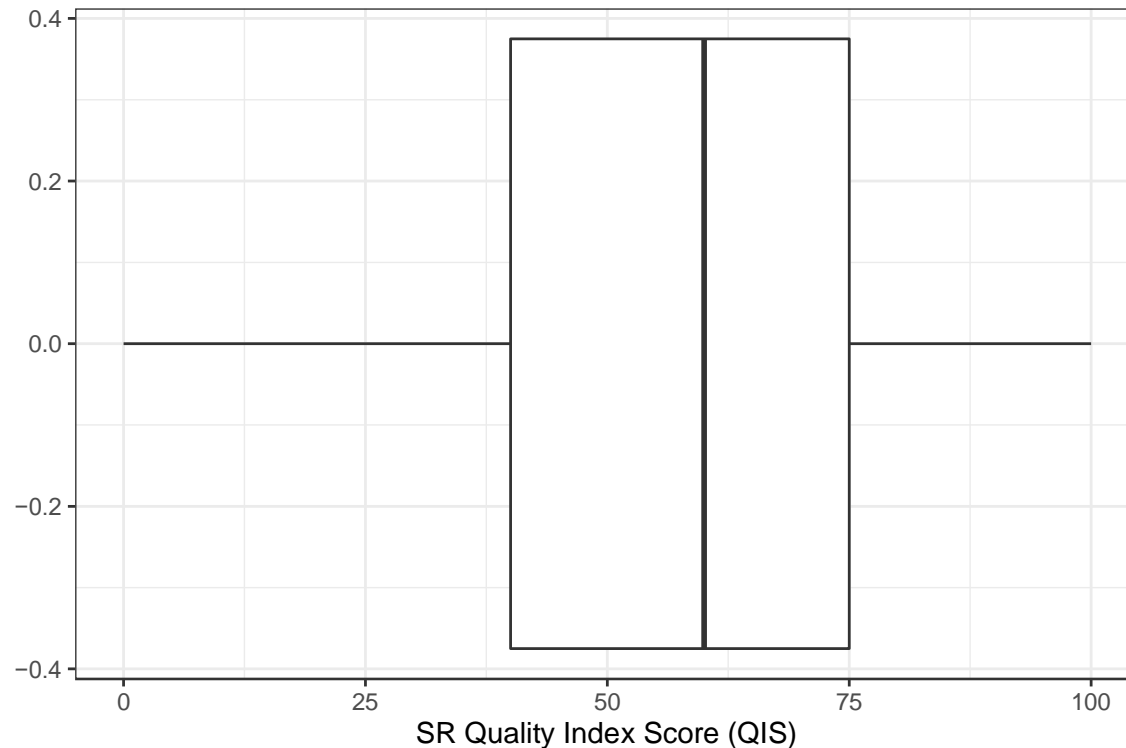
- QIS ranges between 0 and 100
- Dichotomous variables (1 = yes, 0 = no)
- Elements that ensure the reproducibility of a SR are weighted more

```
umbrella_index, score100 =  
10*(2*string + 2*criteria + 2*prisma + irr + qualapp + 0.5*protocol + 1.5*limits)
```

- 34.7 % did not report the full search string
- 34.0 % did not include a PRISMA flow chart
- 37.8 % did not discuss any limitations
- 73.4 % did not conduct a quality appraisal
- 80.7 % did not discuss the issue of interrater-reliability



Distribution of QIS Index

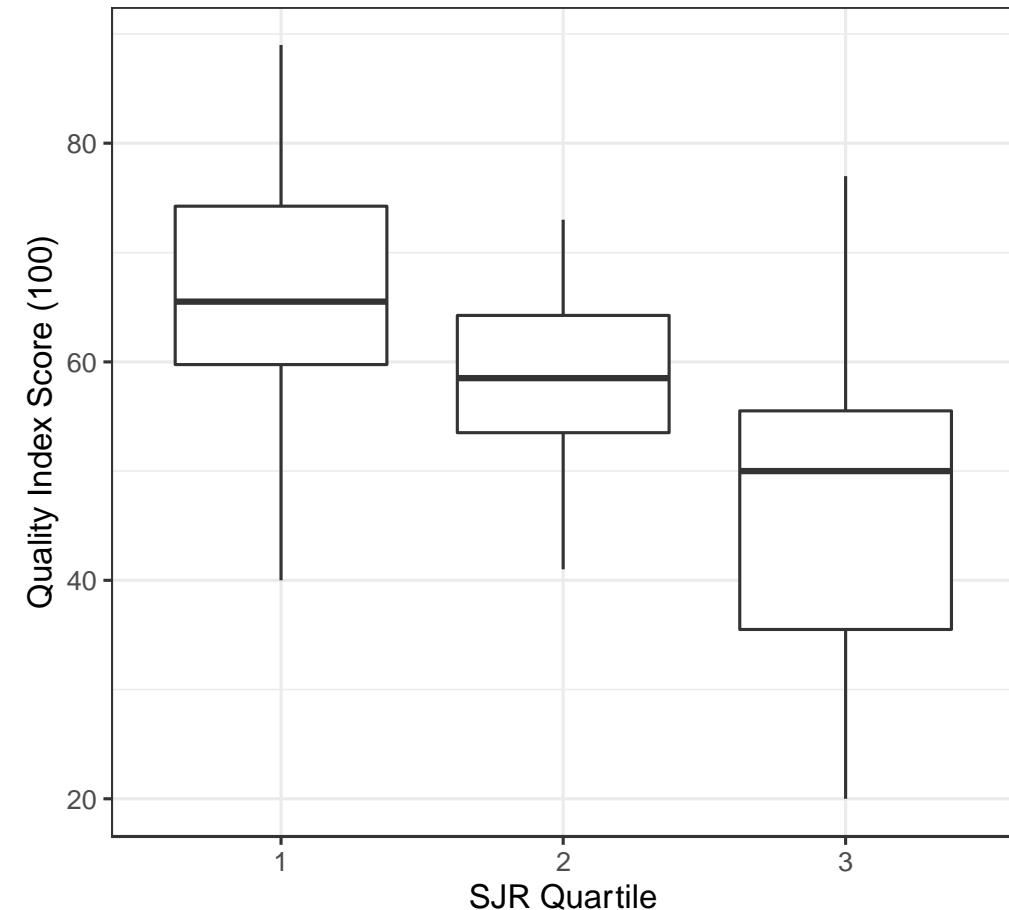


- Median = 60
- 33 with QIS = 0; 74 with QIS \leq 20
- Only 8.1 % with QIS \geq 90

QIS	n	%	Cum. %
0	33	5.7	5.7
5	0	0.0	5.7
10	0	0.0	5.7
15	4	0.7	6.4
20	41	7.1	13.5
25	0	0.0	13.7
30	6	1.0	14.6
35	29	5.0	19.6
40	52	9.0	28.6
45	6	1.0	29.7
50	14	2.4	32.1
55	62	10.8	42.9
60	48	8.3	51.2
65	29	5.0	56.3
70	23	4.0	60.2
75	95	16.5	76.7
80	6	1.0	77.8
85	81	14.1	91.8
90	18	3.1	95.0
95	18	3.1	98.1
100	11	1.9	100.0

Association between Journal Impact Rank and QIS Index

- Based on SCImago Journal Rank (SJR)
- Journals with at least three systematic reviews ($n = 49$)
- The lower the journal impact rank (Q1 to Q3), the lower the quality of the systematic reviews they publish.



Top QIS 100

Authors/Year	Topic	Journal
Arqub, et al. (2022)	Technology-enhanced learning in orthodontics' education	European Journal of Dental Education
Du et al. (2022)	Blended vs. traditional learning in nursing education	Nurse Education in Practice
Gao et al. (2022)	Acceptance of online learning in medical education	Journal of Xiangya Medicine
Grafton-C. et al. (2022)	Online in clinical work-based learning	Medical Teacher
Nowell et al. (2022)	Online education to develop students Remote caring skills and practices	Medical Education Online
Law & Heintz (2021)	Augmented reality applications for k-12 education	International Journal of Child-Computer Interaction
Noetel et al. (2021)	Video-based learning in higher education	Review of Educational Research
Xu et al. (2021)	Psychological interventions of virtual gamification	Journal of Affective Disorders
Youhasan et al. (2021)	Flipped classroom in undergraduate nursing education	BMC Nursing
Adams et al. (2019)	Online learning for university students on the autism spectrum	Australasian Journal of Educational Technology
Liaw et al. (2018)	Virtual worlds in healthcare education	Nurse Education Today

Conclusion – the SR crisis in ODDE

- Many reviews claim to be "systematic"
- In fact, they do not follow the steps in the review process at all!
- Dramatic lack of quality
- They are not systematic, not reproducible – should not get published!
- Urgent need for a better understanding of the SR method in education/ODDE to improve the quality

Thanks for your attention!

Prof. Dr. Olaf Zawacki-Richter

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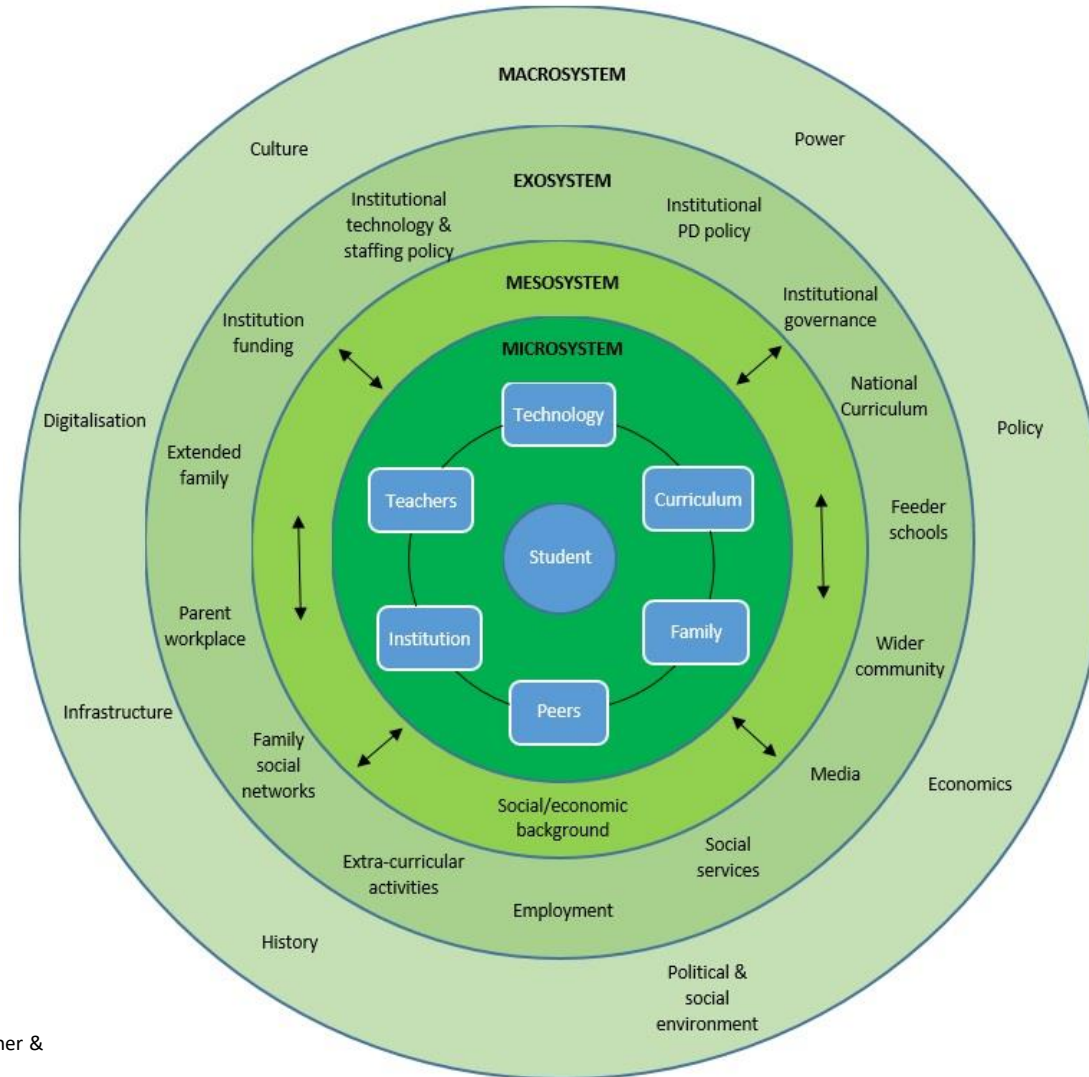
Emergency remote teaching in higher education: Mapping the first global online semester

Research questions

1. Where, when and by whom has research on teaching and learning in higher education during the COVID-19 pandemic been published?
2. What are the characteristics of, methods used, and topics studied in teaching and learning research in higher education during the COVID-19 pandemic?
3. What technology has been used during emergency remote teaching in higher education?

<https://doi.org/10.1186/s41239-021-00282-x>

Bioecological Student Engagement Framework



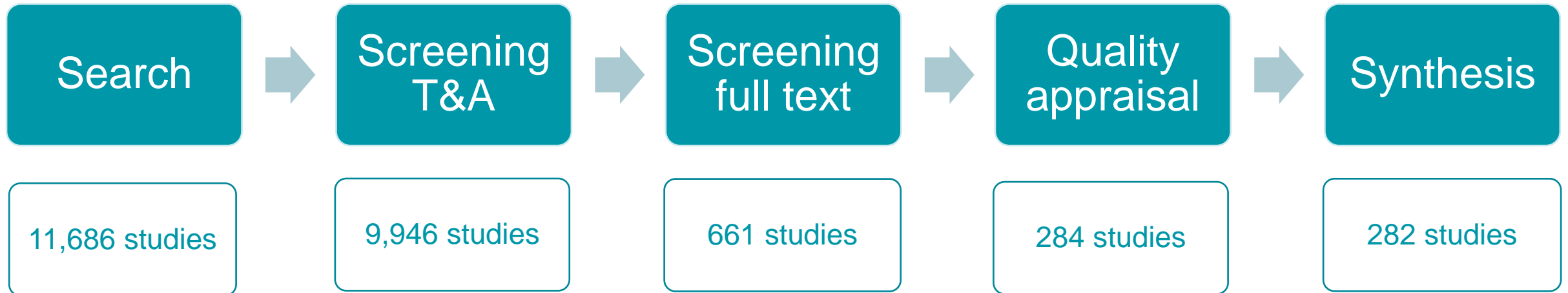
METHOD

Systematic review

- Mapping review using EPPI-Reviewer
- ERIC, Web of Science, Scopus, PsycINFO, Google Scholar, Microsoft Academic Graph, ProQuest, EBSCOHost, COVID-19 living map

Inclusion criteria

- During COVID-19 pandemic
- Higher education
- English, Spanish or German
- Teaching and learning
- Published after Jan 2020
- Primary, empirical research
- Students, educators or administrators as units of analysis



Key Findings

Continent	N	%
Asien	78	27,7%
Europa	77	27,3%
Nordamerika	64	22,7%
Naher Osten	40	14,2%
Süd- und Mittelamerika	18	6,4%
Afrika	17	6,0%
Oceanien	6	2,1%

- Mostly focused on undergraduates (46.1%)
- Health & Welfare (27.3%)
- Natural Science, Maths & Stats (24.1%)
- Education (16%)

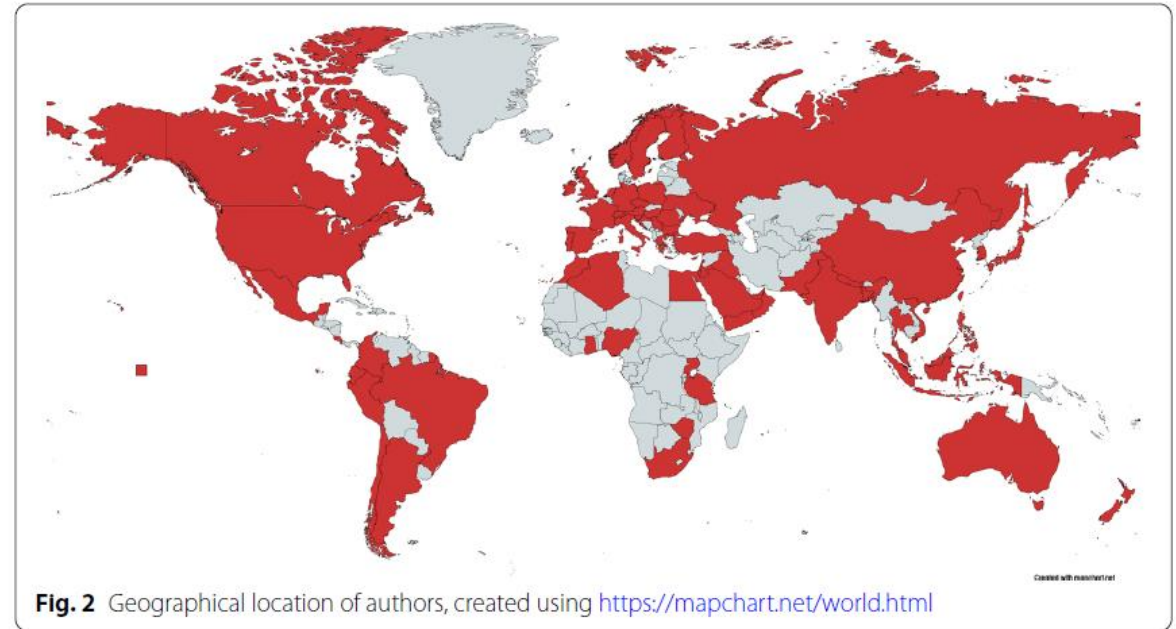


Table 7 Top five topic focus of studies ($n = 282$)

Area of focus	N studies	N studies [%]
Student perceptions of online learning	171	60.6
Impact of shift to online learning	84	29.8
Teacher perceptions of online learning	54	19.1
Students' technical equipment	38	13.5
Course redesign	31	11.0

Top 3 tools used

1. Synchronous collaboration tools (52%)
2. LMS (41%)
3. Multimodal production tools (35%)

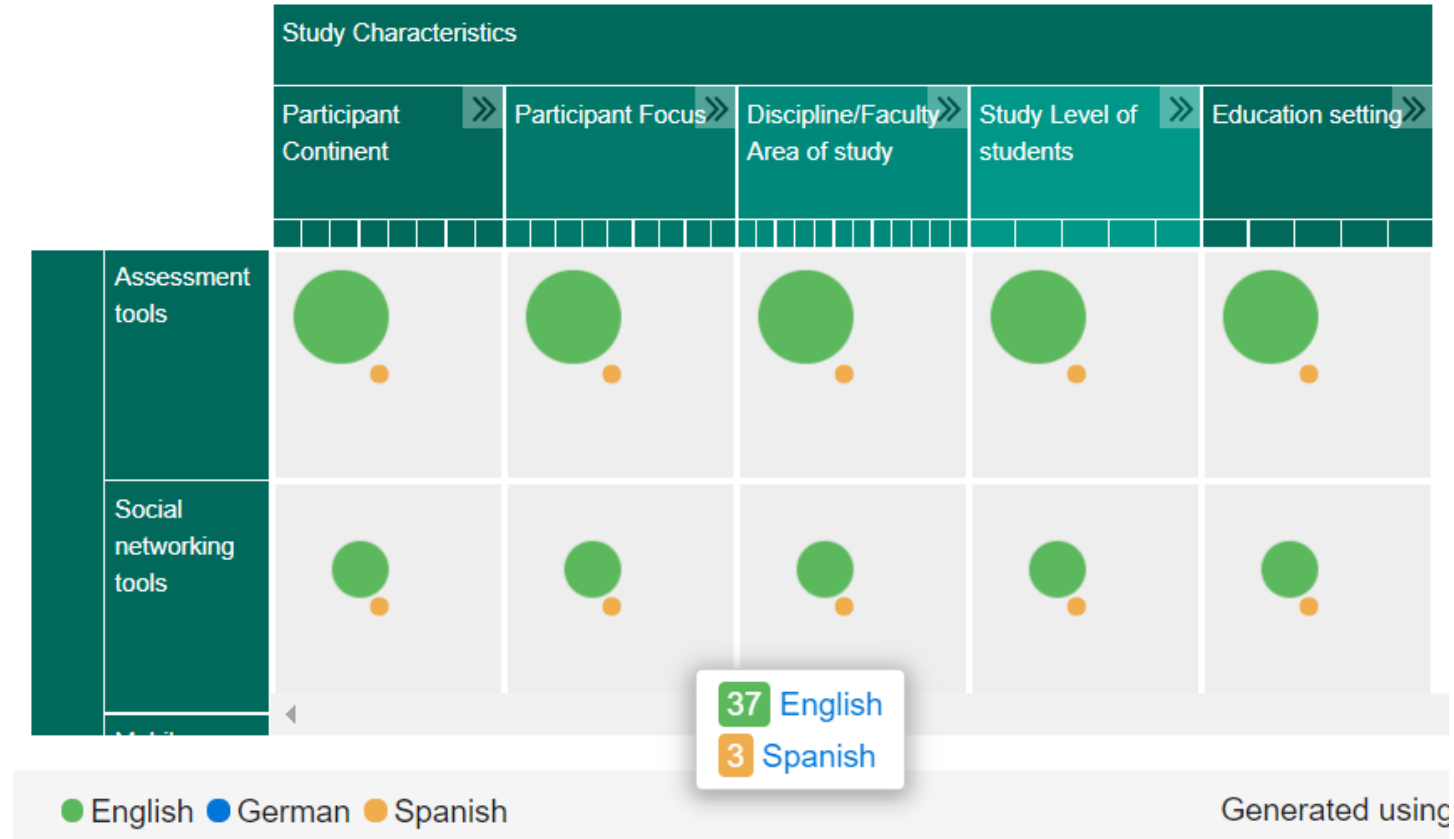
Approach

- Quantitative (53.6%)
- Mixed methods (30.1%)
- Qualitative (16.3%)




Blindspots

- Ethics? Vulnerable groups? Students in their personal environments?
- Greater detail in study design needed, esp. how tech was used.
- Data analytics, assessment tools, social networking tools.
- Postgraduate students far less researched.
- Unbalanced distribution of countries, authors and participants



<https://eppi.ioe.ac.uk/CMS/Portals/35/COVID%20HE%20EGM%20-%20RQ3.html>


EPPI-Reviewer
 LOGIN

HOME HELP **EPPI-MAPPER** RIS EXPORT ABOUT ACCOUNT MANAGER

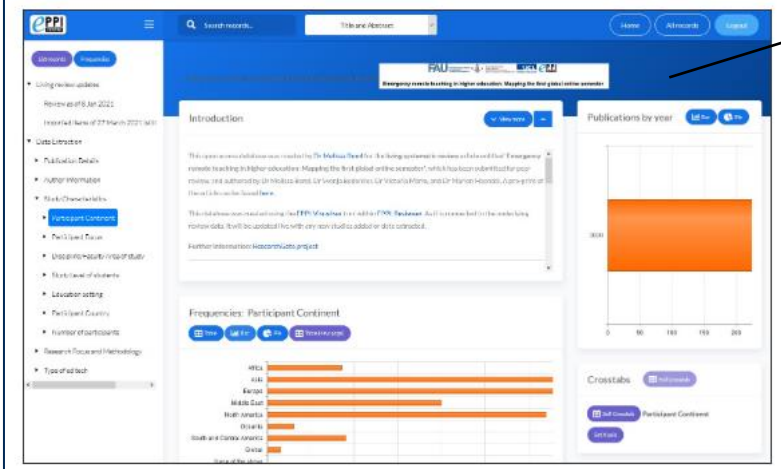
EPPI-Mapper > COVID HE Review

Mapping the emerging field of research on "emergency remote teaching" in higher education due to COVID-19: Implications for education research and practice

Dr Melissa Bond (UCL), Dr Svenja Bedenlier (FAU), Dr Marion Händel (FAU) and Dr Victoria Marin (University of Lincoln)

As a result of the unprecedented impact that the COVID-19 pandemic has had on education, a living systematic review of literature, focused on teaching and learning in higher education. So far, 100 records have been identified and synthesised, but this will be an ongoing project. A pre-print of the first article is [available here](#) and the International Journal of Educational Technology in Higher Education is available [here](#). If you have any research that could be added to the review, please [contact Melissa](#).

Click [here](#) to be taken to an open access database of the coding in the review.



Search records... Title and Abstract
 Home All records Logout

Emergency Remote Teaching in higher education during the COVID-19 pandemic
 A living map of empirical research

Introduction View more

This open access database was created by Dr Melissa Bond for the living systematic review article entitled 'Emergency remote teaching in higher education: Mapping the first global online semester', which has been identified for peer review and authored by Melissa Bond, Dr Svenja Bedenlier, Dr Victoria Marin, and Dr Marion Händel. A pre-print of the article is available [here](#) and the published version can be found open access [here](#).

This database was created using the EPPI-Visualiser tool within EPPI-Reviewer. As it is connected to the underlying review data, it will be updated live with any new studies added or data extracted. The review will be updated again in early September 2021, with many new studies flagged for inclusion.

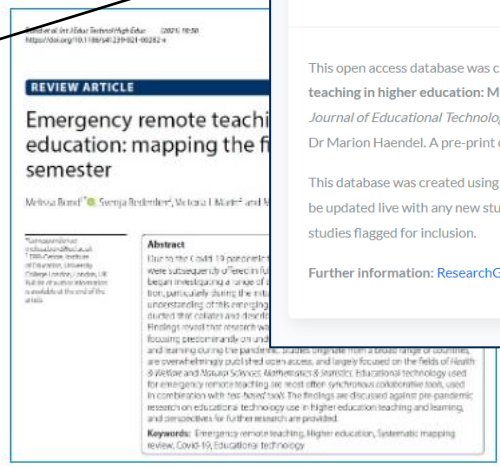
Further information: [ResearchGate project](#)

Publications by year
 Bar Table Save

Year	Count
2020	10
2021	90

Frequencies: Participant Continent
 Bar chart showing participant distribution by continent.

Crosstabs
 Participant Continent



REVIEW ARTICLE
Emergency remote teaching in higher education: mapping the first global online semester
 Melissa Bond¹, Svenja Bedenlier², Victoria Marin³ and Marion Händel⁴

Abstract
 This is the first of a series of 10 papers which were subsequently published in the International Journal of Educational Technology in Higher Education. The authors began investigating a range of factors particularly during the early understanding of this emerging field. The authors describe their collation and description of findings around their research which focused predominantly on teaching and learning during the pandemic. The findings are presented from a broad range of countries, are overwhelmingly published open access, and largely focused on the fields of Health & Welfare and Natural Sciences. Mathematics & Statistics, Information Technology used for emergency remote teaching, the most often synchronous collaborative tools, used in combination with face-to-face tools. The findings are discussed against pre-pandemic research on educational technology use in higher education teaching and learning, and implications for further research are provided.

Keywords: Emergency remote teaching, Higher education, Systematic mapping review, COVID-19, Educational technology

Interactive evidence gap maps

<https://eppi.ioe.ac.uk/cms/Default.aspx?tabid=3802>

Review questions

- Identify and clearly define the question/s your review will address.
 - PICOTS framework (see Boland et al., 2017):

Review questions

- Identify and clearly define the question/s your review will address.
 - PICOTS framework (see Boland et al., 2017):
 - **P**opulation (e.g. the types of students)
 - **I**ntervention (e.g. the specific technology)
 - **C**omparator (e.g. compared to traditional classrooms)
 - **O**utcome/s (e.g. student engagement)
 - **T**iming (e.g. between 2012 and 2019)
 - **S**etting (e.g. Africa) OR **S**tudy design (e.g. RCTs)

Chen, Lui, & Martinelli (2017)

1. What is the scope of the studies that have been published on flipped classrooms in medical education?
2. What is the research quality of the studies examined?
3. What are the effects of the flipped classroom, as reported by controlled studies?
 - Population:
 - Intervention:
 - Comparator:
 - Outcome:

Developing search strings

- Your search string combines the key concepts of your question, in order to retrieve accurate results.
- Each database is different, so it's best to begin with a master list of terms.
- According to Bramer et al. (2018), it is important to:
 - Identify example articles that can answer your question.
 - Decide which key concepts address the different elements of the question.
 - Decide which elements should be used for the best results.
 - Choose an appropriate database to begin with (e.g. WoS).
 - Use the thesaurus feature of the database to identify synonyms.

Brainstorming search terms

	Concept 1	Concept 2	Concept 3	Concept 4
Key concepts	Identify the key concept of your review question/s			
Free text terms	Brainstorm synonyms, acronyms/abbreviations, use a thesaurus or Google, look at words in titles/abstracts			
Author keywords/ keywords plus	Do a quick search in WoS using your concepts and write down relevant author keywords/keywords plus			

Brainstorming search terms

Key concepts

Learning the basic concepts of programming and its foundations is considered as a challenging task for students to figure out. It is a challenging process for lecturers to learn these concepts, as well. The current literature on programming training abounds with the examples of a wide range of methods employed. Within this context, one of the prominent approaches in programming training is flipped classroom (FC) model. This article has sought to illuminate the effect of cognitive flexibility, problem-solving skills (PSS), and **flipped learning** readiness (FLR) levels on students' programming achievements in programming training through FC model. A total of 149 freshmen computer science students studying in a state university in Turkey were recruited for this study. In this study, designed as a relational screening model, a personal form, an achievement test, and three different data collection instruments were employed to collect data. For the data analysis, structural equation modeling, a multivariate statistical analysis technique, was used to reveal a model explaining and predicting the relations between programming achievement and different variables. The findings clearly indicate that FLR is the most important predictor of the programming achievements of students in FC. Other important predictors were found as PSS and cognitive flexibility. The research model demonstrates that an increase or development in FLR, PSS, and cognitive flexibility levels in FC will enhance the achievements of students in programming.

Free text

Keywords

Author Keywords: programming training; App Inventor; flipped classroom; cognitive flexibility; problem-solving skills; university students

KeyWords Plus: COGNITIVE FLEXIBILITY; SELF-EFFICACY; LANGUAGE; STUDENTS; IMPACT; EDUCATION; DESIGN; PERSPECTIVES; ACHIEVEMENT; RELIABILITY

Cited References

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**Author keywords/
keywords plus**

Do a quick search in WoS using your concepts and write down relevant author keywords/keywords plus

Example search strings

Topic	Search terms
Artificial intelligence	"artificial intelligence" OR "machine intelligence" OR "intelligent support" OR "intelligent virtual reality" OR "chat bot*" OR "machine learning" OR "automated tutor" OR "personal tutor*" OR "intelligent agent*" OR "expert system" OR "neural network" OR "natural language processing"
AND	
Education level	"higher education" OR college* OR undergrad* OR graduate OR postgrad* OR "K-12" OR kindergarten* OR "corporate training*" OR "professional training*" OR "primary school*" OR "middle school*" OR "high school*" OR "elementary school*" OR "vocational education" OR "adult education"
AND	
Learning setting	learn* OR student*

Example search strings

“emergency remote teaching” OR “student-centred remote teaching” OR “emergency remote education” OR “student-centered remote teaching” OR “COVID-19” OR “COVID19” OR pandemic OR “Corona virus” OR “online pivot”

AND

“K-12” OR kindergarten OR kindy OR “primary school” OR “middle school” OR “secondary school” OR school OR “high school” OR “reception” OR “R-12” OR “junior primary” OR “elementary school” OR “middle primary” OR “upper primary” OR “senior school”

NOT

“public health” OR nonpharmaceutical OR energy OR pharmaceutical OR pharmacy OR clinic* OR pathology OR telemedicine OR inflammation OR patient* OR neurolog* OR telehealth OR surgery OR universit* OR “higher education” OR postgrad* OR undergrad* OR “tertiary education” OR college

Figure 3. Search string

Brainstorming search terms

	Concept 1	Concept 2	Concept 3	Concept 4
Key concepts	Higher education students	Science, Engineering, Technology	African context	Mobile learning
Free text terms	<ul style="list-style-type: none"> • higher education • Undergraduate • Postgraduate • university 	<ul style="list-style-type: none"> • Science • Engineering • Technology • STEM 	<ul style="list-style-type: none"> • Africa 	<ul style="list-style-type: none"> • mobile learning • mLearning • m-learning
Author keywords/ keywords plus				mobile devices

Record keeping log

Database searched	Web of Science
Search Set	1 and 2
Date of search	10/7/2017
Person searching	Melissa Bond and Svenja Bedenlier
Database settings	Refined by: LANGUAGES: (ENGLISH) AND DOCUMENT TYPES: (ARTICLE) Timespan: 1995-2017. Indexes: SCI-EXPANDED, SSCI, A&HCI, ESCI.
No. Of records obtained	9,517
Search string	TS=(learner* or student*) AND TS=("higher education" OR universit* OR college* OR undergrad* OR graduate OR postgrad*) AND TS=("educational technolog*" or "learning technolog*" OR "digital learning" OR "digital education" OR "app" OR "digital technolog*" OR "digital media" OR "social media" OR "social network*" OR "social web" OR vodcast* OR podcast* OR "digital broadcasting" OR blog* OR weblog* OR "electronic publishing" OR microblog* OR "interactive whiteboard*" OR simulation* OR forum* OR "computer-mediated communication" OR "computer * network*" OR ePortfolio OR e-Portfolio OR eAssessment OR e-Assessment OR "computer-based testing" OR "computer-assisted testing" OR OER OR "open educational resource*" OR "open access" OR "open source*" OR "information and communication technolog*" OR "information technolog*" OR "social tagging" OR tablet* OR "handheld device*" OR "mobile device*" OR "smart*phone*" OR "electronic book*" OR eBook*) NOT TS=("K-12" OR kindergarten* OR "corporate training*" OR "professional training*" OR "primary school*" OR "middle school*" OR "vocational education" OR "adult education")

Search strategy

1. Decide what types of studies and data will answer your question.
 - Empirical research only?
 - Grey literature?
 - Both quantitative and qualitative data?

 2. Which databases/platforms will you search in?*
- Web of Science
 - EBSCO Host (e.g. ERIC)
 - Scopus
 - PsycINFO
 - ProQuest
 - Teacher Reference Center
 - Science Direct

* Gusenbauer & Haddaway (2019)

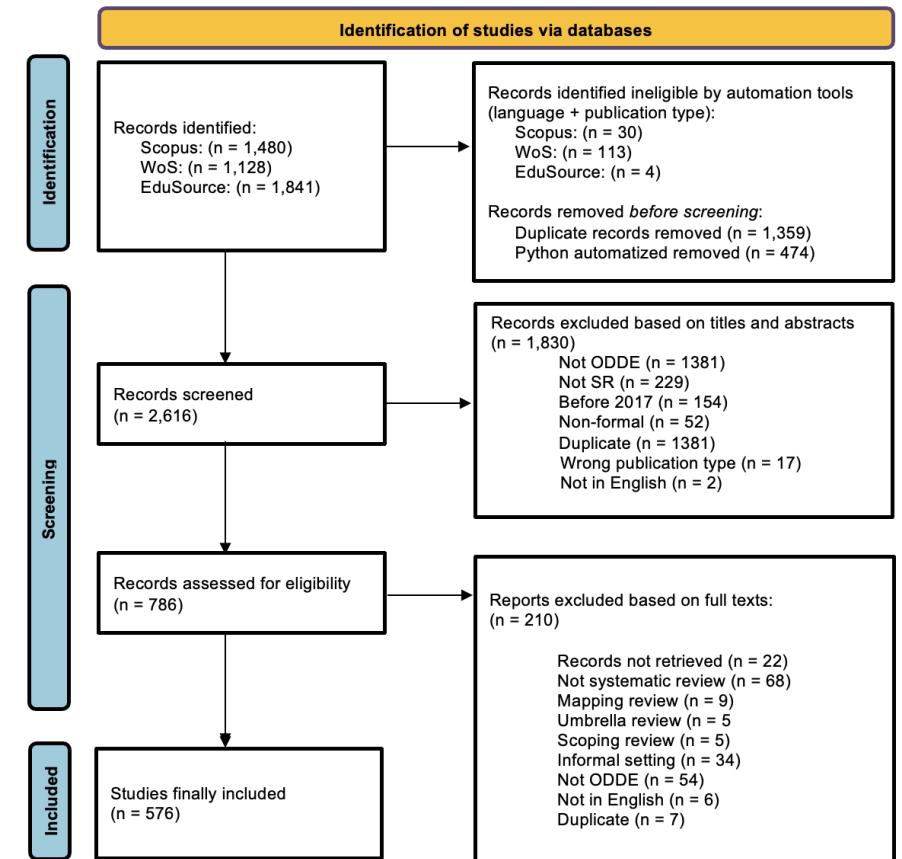
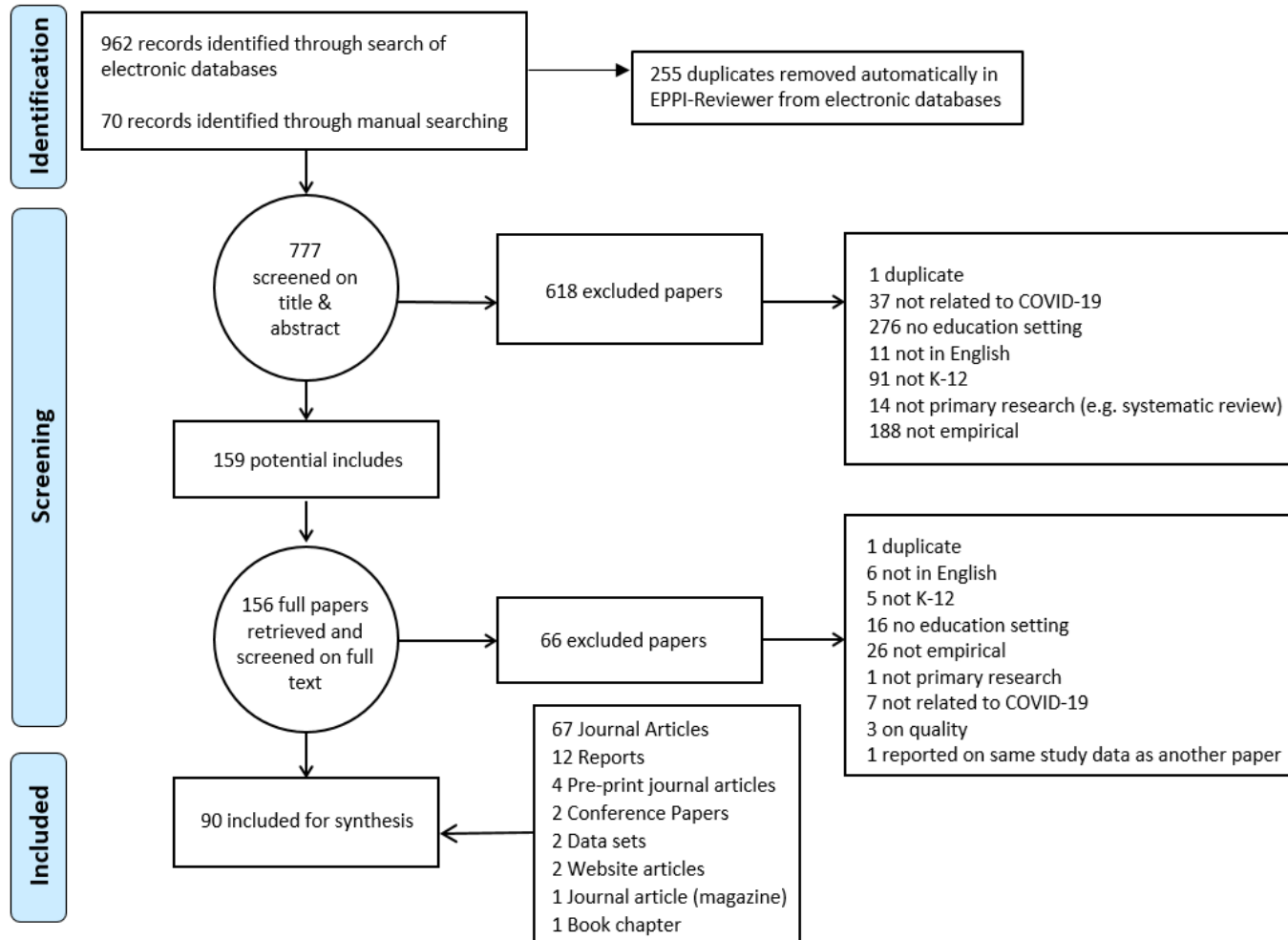
Search strategy

3. Decide on the study inclusion/exclusion criteria

- For example:

Include	Exclude
Published between 2007-2016	Published before 2007 or after 2016
English language	Not in English
Primary, empirical research	Reviews or theoretical articles
Journal articles	Grey literature
Higher education	Schooling or further education
Educational technology	Description of a tool or evaluation
Student engagement	No educational technology
In an educational setting	No student engagement
	No learning setting

PRISMA reporting guidelines



Sensitivity vs Specificity

- Include rather than exclude

- Visiting Inclusion and Exclusion Criteria

- Setting the screening process

Interrater Reliability

- e.g. Cohen's Kappa (1960)
- Fleiss Kappa

Quality Appraisal

- Critical Appraisal
- (Petticrew and Roberts 2005)

- Cohen's kappa: a measure for the agreement between two raters
 - The hypothetical probability of agreement by chance.
 - Simple relative agreement would overestimate agreement that can occur by chance
 - e.g. 19 out of 20 = 95 % agreement
- see Cohen's kappa free calculator:
<https://idostatistics.com/cohen-kappa-free-calculator/>
- Aim: $k > .70$

- **Quality Appraisal (Gough 2007)**
 - Is the study design appropriate to my research/review question(s)?
 - How is the quality of study methods?
 - Is the study relevant to my research/review question(s)?
- **Roots in “medicine” studies**
 - **CASP Checklists** - Critical Appraisals Skills Programme
 - Systematic Reviews, Randomized Controlled Trials, Cohort Studies, Case Control Studies, Economic Evaluations, Diagnostic Studies, Qualitative studies and Clinical Prediction Rule
 - **GRADE** - Grading of Recommendations, Assessment, Development and Evaluations
 - **JBI Critical Appraisal Tools** - Joanna Briggs Institute, trustworthiness, relevance and results

Data extraction

1. Decide what data you want to extract
 - Look at previous SRs as to what should be included
 - Descriptive (e.g. study and participant characteristics)
 - Analytical (e.g. outcomes)
 - Keep it relevant
 - Conceptual framework
2. Decide how and where you will store extracted information
 - SR software does this for you
3. Highlight where in articles the data comes from (page number)

- ▼  Data Extraction
 - ▶ Article Details
 - ▼ Description of Study Sample
 - ▶ Country
 - ▶ Sample Focus
 - ▶ Number of participants
 - ▶ Sampling & recruitment
 - ▶ Participant consent
 - ▶ Age of participants
 - ▶ Year Level
 - ▶ Gender
 - ▶ Disability
 - ▶ School Type
 - ▶ Subject
 - ▶ Class Size
 - ▶ Study Design
 - ▶ Methodology
 - ▶ Findings

Synthesis

Ask yourself the following questions:

1. How can you pull the results together?
 - Why choose that method?
 - Does it accurately represent what was found?
2. Overall, what is the research suggesting in relation to the question?
3. How can you best describe and represent what the research is saying?
4. How clearly or confidently can the review question be answered?

Meta analysis

A statistical technique to combine results from multiple studies to give an overall measure.

Table 3
Results of the univariate random-effects meta-analyses.

Dependent variable	<i>k</i> (#students)	<i>g</i> (<i>p</i>)	<i>SE</i>	95% CI	<i>Q</i> (<i>p</i>)	<i>df_q</i>	τ^2 (<i>SE</i>)	<i>I</i> ²
Assessed learning outcomes	114 (20318)	0.36 (< .001)	0.04	[0.28, 0.44]	1221.86 (< .001)	113	0.14 (0.02)	88%
Perceived learning outcomes	8 (953)	0.36 (.13)	0.21	[-0.13, 0.85]	39.45 (< .001)	7	0.28 (0.18)	87%
Student satisfaction	22 (3501)	0.05 (.73)	0.13	[-0.23, 0.32]	181.99 (< .001)	21	0.33 (0.12)	92%

Van Alten et al. (2019, p. 10)

Note. *k* = number of studies; # students = total number of participants; *g* = mean weighted effect size in Hedges' *g*; *SE* = standard error; CI = confidence interval; *Q* = Cochran's heterogeneity test; *df* = degrees of freedom *Q*-test; τ^2 = between-study variance; *I*² = percentage of variation between studies that is due to heterogeneity rather than sampling error.

Narrative Synthesis

A valid method to analyse and assemble evidence (Petticrew & Roberts, 2006).

1. A narrative description of the study and participant characteristics.
2. A summary of key results, preferably informed by the theoretical framework.
3. Tabulation of the studies, providing an overview of the study setting, methods, participants, intervention and study findings.

Appendix G List of studies in the corpus (n = 107)

Dissertations (n = 26)

Author	Year	Institution	Subject	Grade	School Type	Study Duration	Approach	Participants	Ed Tech	BE	AE	CE	BD	AD	CD	Ach
Johnson & Renner	2012	Uni. of Louisville	ICT	9–11	HS	12 weeks	Quasi-Exp.	S, T		X	X	X	X	X	X	
Howell	2013	Gardner-Webb Uni.	Science	9	HS	11 weeks	Quasi-Exp.	S, T, P		X	X	X	X			X
Wiginton	2013	Uni. of Alabama	Maths	9	HS	16 weeks	Case Study	S, T		X	X	X	X	X	X	
Saunders	2014	Liberty Uni.	Maths	11	HS	9 weeks	Quasi-Exp.	S								X
Collins	2015	The Sage Colleges	Multiple	5–9	MS	N/S	Phenomenology	T, SL		X	X	X	X			X
Huereca	2015	Uni. of Texas	Maths	N/S	HS	1 year	Narrative Inq	T		X			X	X	X	
Ramaglia	2015	Kansas State Uni.	Maths	7–12	MS / HS	N/S	Quasi-Exp.	S, T		X	X	X	X	X		
Ripley	2015	Uni. of Nevada	Maths	6	PS	1 year	Quasi-Exp.	S, T		X	X	X			X	
Speller	2015	Uni. of Toledo	Maths	N/S	MS / HS	9 weeks	Phenomenology	T		X	X	X	X			
Wiley	2015	Uni. of Minnesota	Maths	5	PS	32 classes	CCMM	S, T		X	X			X	X	
Duffy	2016	Wilkes Uni.	Science	8	MS	3 weeks	Quasi-Exp.	S		X						X
Hunley	2016	East Tennessee State Uni	Multiple	9–12	HS	N/S	Phenomenology	S, T		X	X	X	X	X	X	
Oyola	2016	Missouri Baptist Uni.	Multiple	N/S	K / PS	N/S	Case Study	T		X	X	X				
Perrella	2016	Hofstra Uni.	Foreign Lang.	9–11	MS	28 weeks	Experimental	S								X
Sharpe	2016	Regent Uni.	Maths	9–11	HS	8 weeks	Experimental	S		X	X		X	X	X	
Strohmyer	2016	Walden Uni.	Maths	12	HS	2 weeks	Phenomenology	S		X	X	X	X	X		
Tarazi	2016	Northcentral Uni.	Maths	11	HS	4 months	Quasi-Exp.	S								X
Bergstresser	2017	Northcentral Uni.	Multiple	5–12	5-12	1 year	Quasi-Exp.	S		X		X		X		
Caverly	2017	New Jersey City Uni.	Maths	11 - 12	HS	2 weeks	Quasi-Exp.	S		X	X	X		X	X	
Leo	2017	Uni. of South Carolina	Maths	7	MS	6 weeks	Action Res.	S, T		X	X	X		X	X	
Carlisle	2018	Trevecca Nazarene Uni.	Maths	9–12	K-12	1 year	CSMM	S		X	X					
Lazarus	2018	Arizona State Uni.	SS	12	HS	1 semester	Action Res.	S		X	X	X				
Parham	2018	Uni. of South Carolina	Maths	12	HS	4 weeks	Action Res.	S		X	X	X	X	X		
Ronnebaum	2018	Uni. of Kansas	Maths	9	HS	9 months	Quasi-Exp.	S, T		X			X			
Weidmann	2018	Liberty Uni.	Multiple	7 - 12	HS	N/S	Phenomenology	T		X	X	X		X		X
Weiss	2018	Trevecca Nazarene Uni.	Biology	9	HS	1 semester	Quasi-Exp.	S		X	X		X	X	X	

Note: ELA = English Language Arts, SS = Social Studies, MS = Middle School, PS = Primary School, HS = High School, K = Kindergarten, S = Students, T = Teachers, P = Parents, SL = Principals, N/S = Not specified, BE = behavioural engagement, AE = affective engagement, CE = cognitive engagement, BD = behavioural disengagement, AD = affective disengagement, CD = cognitive disengagement, Ach = Achievement, CCMM = Convergent Concurrent Mixed Methods, CSMM = Cross-sectional Mixed Methods,

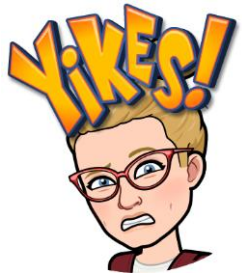
= Videos created by others, = Quizzes, = Teacher-created videos, = LMS, = YouTube, = Edmodo, = Google Forms, = Google Classroom, = Moodle, = Videos (uncertain), = Edpuzzle, = Google Docs, = Twitter

All icons obtained from www.flaticon.com with the exception of Khan Academy (<https://www.youtube.com/user/khanacademy>), Edmodo (<https://www.amazon.com/Edmodo-Inc/dp/B00721LOXC0>), Google Classroom (<https://classroom.google.com>), Google Docs (https://en.wikipedia.org/wiki/Google_Docs), Edpuzzle (https://www.youtube.com/channel/UC-wRQQ_gfvSomuZJaBLRshQ), Moodle (<https://tracker.moodle.org>), PlayPosit (<https://iteachu.uaf.edu/playposit-interactive-video-tool/>), Blendspace (<https://www.tes.com/lessons>), Socrative (<https://socrative.com/>) and Zmaker (<http://zmaker.emaghome.com/>).

Mel is currently conducting a **Scoping Review of AIEd reviews, with 257 coded so far...**

Although it has been found to make the process more efficient, especially when using machine learning tools¹,

- ❖ 55.6% of reviews didn't report which technology was used to conduct the review.
- ❖ Of those that did report it...
 - 15.2% used Excel
 - 13.2% used reference management software (e.g. EndNote)
 - Only **5% of AIEd reviews** used tailored systematic reviewing software
 - Rayyan² ($n = 6$)
 - EPPI-Reviewer ($n = 3$)
 - Covidence³ ($n = 3$)
 - DistillerSR⁴ ($n = 1$)

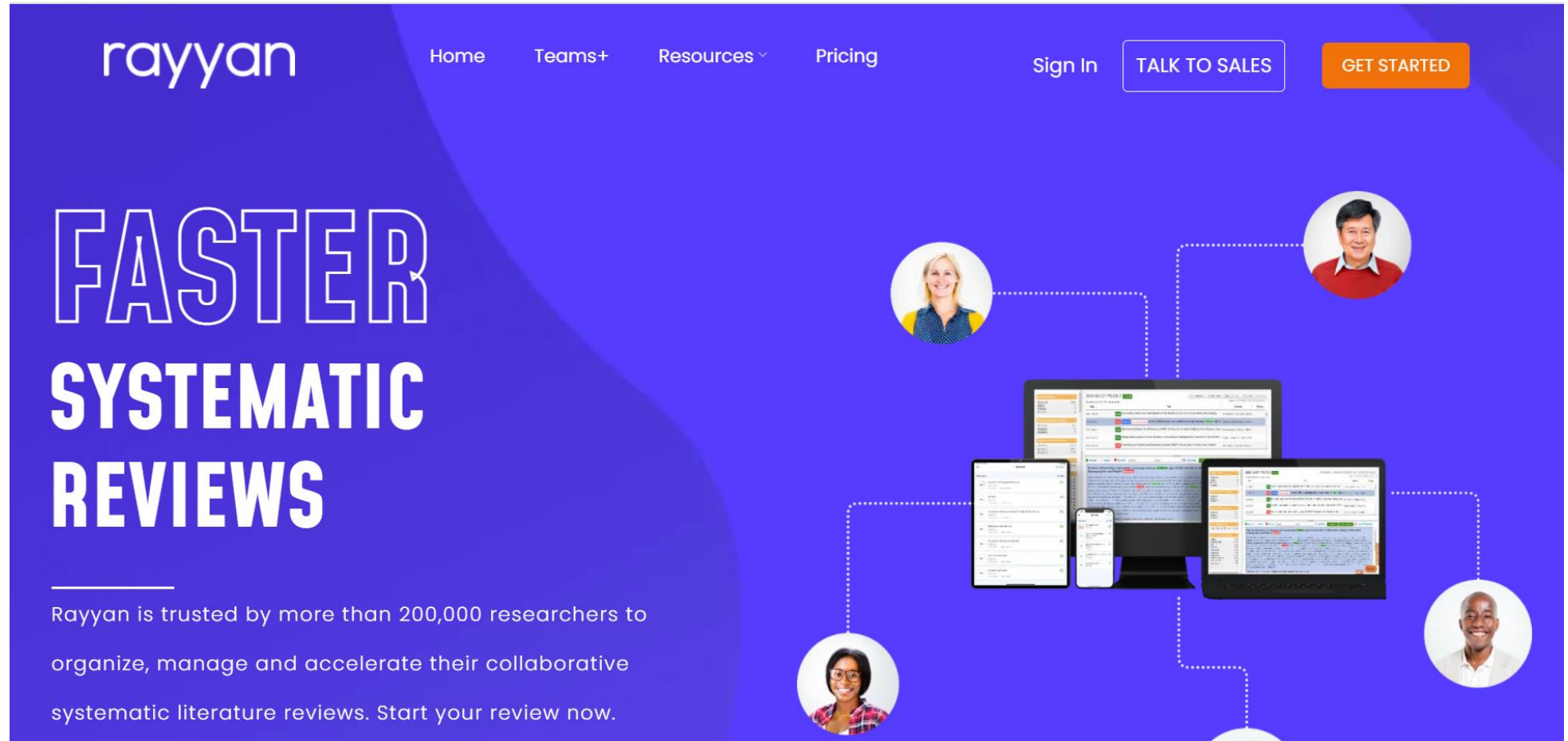


1. Cowie et al. (2022), Harrison et al. (2020), Kebede et al. (2022), Marshall & Wallace (2019), Tsou et al. (2020)
2. <https://www.rayyan.ai/>
3. <https://www.covidence.org/>
4. <https://www.distillersr.com/products/distillersr-systematic-review-software>

rayyan

 Leximancer

 VOSviewer
Visualizing scientific landscapes



The image shows a promotional banner for the Rayyan website. The background is a vibrant blue with a white abstract shape on the left. At the top left, the Rayyan logo is displayed in white. To its right is a navigation menu with links for Home, Teams+, Resources (with a dropdown arrow), and Pricing. Further right are links for Sign In, a white button labeled TALK TO SALES, and an orange button labeled GET STARTED. The main headline, 'FASTER SYSTEMATIC REVIEWS', is written in large, bold, white, outlined letters. Below this, a short paragraph states: 'Rayyan is trusted by more than 200,000 researchers to organize, manage and accelerate their collaborative systematic literature reviews. Start your review now.' On the right side, there is a central graphic featuring a desktop monitor, a laptop, and a smartphone, all displaying the Rayyan software interface. This graphic is surrounded by four circular profile pictures of diverse individuals, connected to the central devices by white dotted lines, symbolizing collaborative work.

rayyan

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2021-05-28: Sys_Rev_DROPOUT

Detect duplicates Compute ratings Export Copy New search All reviews

Showing 16 to 22 of 1,804 unique entries Search: [id or title or abstract or author]

Date		Title	Authors	Rating
2020-01-01	Berrin	Desperately seeking funding: library guides to student funding	Lundy, R.; Curran, R.	
2020-01-01	Berrin	Not student retention Reusable learning objects: a blended learning tool in teac...	Onofrei, G.; Ferry, P.	
2020-01-01	Berrin	BCS An early warning system to detect at-risk students in online higher educ...	Bañeres, D.; Rodríguez, M.E...	
2020-01-01	Berrin	Learner analytics in engineering education: A detailed account of practices u...	Kittur, J.; Bekki, J.M.; Brunh...	

Inclusion decisions	
Undecided	0
Maybe	0
Included	632
Excluded	1172

2020-01-01	Berrin	see again	wrong population	Factors affecting student dropout in MOOCs: a caus...	Aldowah, H.; Al-Samarraie, ...
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Keywords for include [Add new] —

<u>online</u>	1185	🗑
<u>retention</u>	907	🗑
<u>persistence</u>	264	🗑
<u>attrition</u>	235	🗑
<u>dropout</u>	218	🗑
<u>student retention</u>	211	🗑
<u>drop_out</u>	115	🗑
<u>student persistence</u>	50	🗑
<u>drop-out</u>	42	🗑
<u>student attrition</u>	40	🗑

[More >>](#)

Keywords for exclude [Add new] —

<u>school</u>	233	🗑
<u>high school</u>	50	🗑
<u>knowledge retention</u>	48	🗑
<u>secondary school</u>	26	🗑
<u>learning retention</u>	17	🗑
<u>information retention</u>	6	🗑
<u>content retention</u>	4	🗑

Labels —

<u>must read</u>	48	
<u>BCS</u>	13	
<u>see again</u>	10	
<u>READ!</u>	3	
<u>doctoral&masters</u>	1	
<u>Conceptual Map</u>	1	
<u>MOOC in HE</u>	1	
<u>TEL?</u>	1	

Journal —

<u>International Review of Resear...</u>	44	
<u>Online Journal of Distance Lea...</u>	34	
<u>Nurse Education Today</u>	33	
<u>Online Learning</u>	33	
<u>Computers & Education</u>	33	
<u>Computers in Human Behavior</u>	27	
<u>Journal of College Student Ret...</u>	22	
<u>Proceedings of the European C...</u>	20	
<u>Distance Education</u>	20	
<u>eLearning & Software for Educ...</u>	20	

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Authors —

<u>Hacney, Alyse C.</u>	8	
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<u>Uhomoibhi J.</u>	6	
<u>Zvacek S.</u>	5	
<u>Borup, Jered</u>	4	
<u>Wibberley, Christopher</u>	4	
<u>Rockinson-Szapkiw, Amanda J.</u>	4	
<u>Kotsiantis, S.</u>	4	

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- Keywords to ease spotting irrelevant studies
- Labels to enrich your library
- Overview of the descriptive data

- Sign-up to Rayyan account: <https://www.rayyan.ai/>
- Set-up a new systematic review
- Import your RIS file
- Invite collaborators


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Go beyond text, find meaning.

Leximancer 5 **Leximancer Topic Guide**

The banner features a dark blue and black starry night sky background with a silhouette of a person standing on a hill. The Leximancer logo is in the top left, and navigation links (Products, Support, Contact Us, Blog) and a 'Free 30 days' badge are in the top right. The central text reads 'Go beyond text, find meaning.' Below this, a tablet displays the Leximancer 5 interface, which includes a project list, a network diagram of topics, and an 'Analyst Synopsis' table. The 'Leximancer 5' and 'Leximancer Topic Guide' labels are positioned below the tablet.

Theme	Hits
army	888
armies	877
Sea Force	207
navies	187
air	136
Chosen	130
in	85
ground	81
air	73
navy	68
airway	54



The screenshot shows the VOSviewer website interface. At the top, there is a navigation bar with the VOSviewer logo and the tagline "Visualizing scientific landscapes". The navigation menu includes: Home, Features, Getting Started, Download, Publications, Products, Course, and Contact. Below the navigation bar is a large network visualization of university affiliations. The nodes are labeled with university names and are connected by lines representing relationships. The nodes are color-coded and arranged in a circular pattern. Some prominent nodes include Harvard Univ, MIT, Caltech, and various international universities like King's Coll London, Univ Coll London, and others.

Welcome to VOSviewer

VOSviewer is a software tool for constructing and visualizing bibliometric networks. These networks may for instance include journals, researchers, or individual publications, and they can be constructed based on citation, bibliographic coupling, co-citation, or co-authorship relations. VOSviewer also offers text mining functionality that can be used to construct and visualize co-occurrence networks of important terms extracted from a body of scientific literature.

EPPI-Reviewer evidence synthesis software was created to support the **methodological work** conducted at the EPPI-Centre.

- Web-based - accessed from any device with an internet connection.
- Developed for all types of systematic review.
- Designed for flexibility.

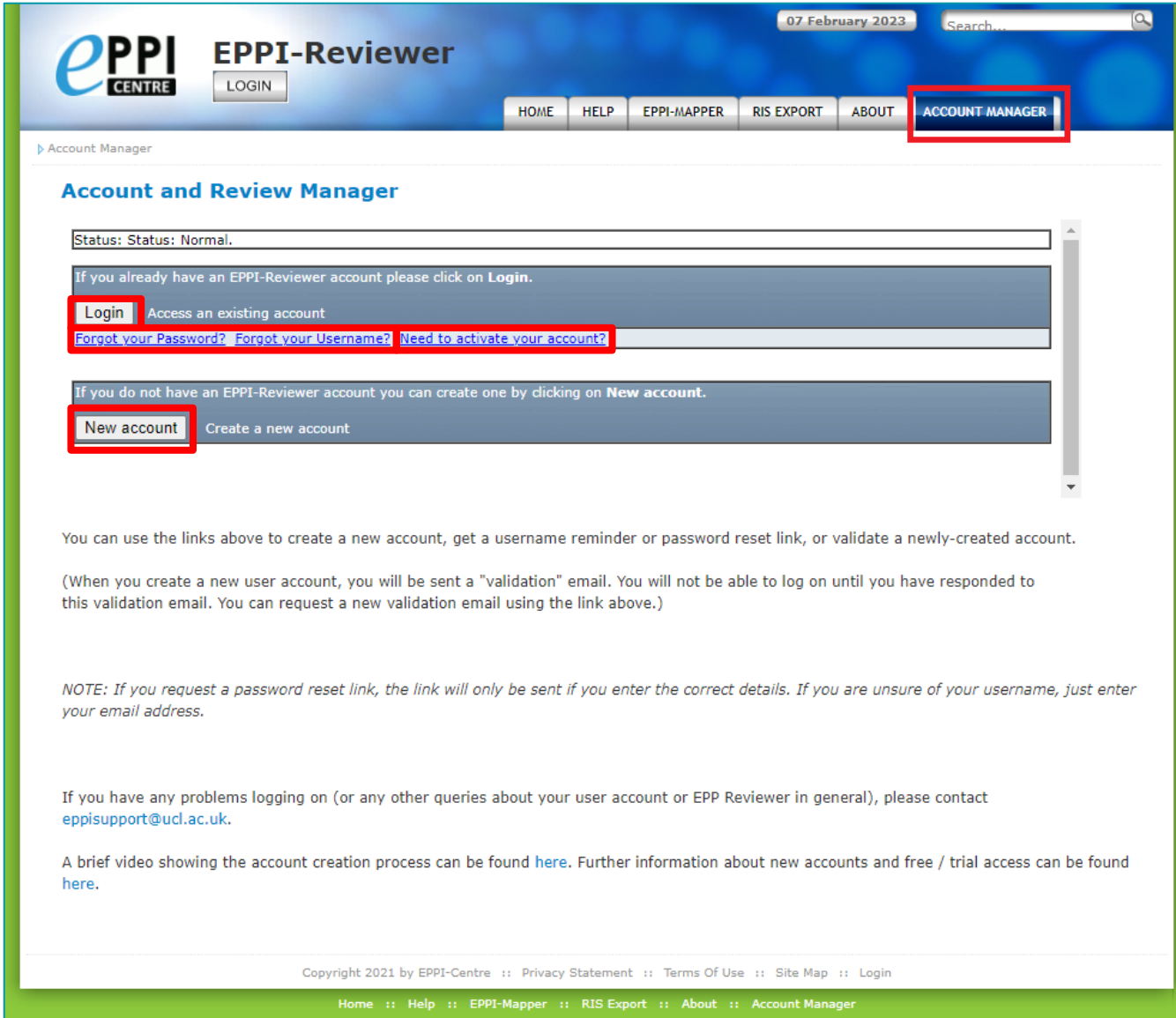
EPPI-Reviewer helps by:

- keeping your review process explicit and replicable
- enabling you to work with many others in one review
- keeping your data in one place
- helping with large screening loads through priority screening
- enabling updates to your review, including through machine learning
- allowing the easy creation of interactive evidence gap maps

The screenshot displays the EPPI-Reviewer web interface. At the top, there are navigation tabs: 'Review home', 'References', 'Reports', 'Search & Classify', and 'Collaborate'. Below this is a 'Review Items' section with buttons for 'Import Items', 'Manage Duplicates', and 'Update review'. It shows summary statistics: 'Included: 396', 'Excluded: 9664', 'Deleted: 2040', and 'Duplicates: 1740'. A 'Coding Progress' section includes a 'Coding Tools' dropdown and a refresh icon. The main area is divided into 'Screening Tools', 'Standard Tools', and 'Administration Tools', each with a table of tool usage.

Tool Category	Tool Name	Completed (Green)	Failed (Red)
Screening Tools	Screen on Title and Abstract	9946	0
	Screen on Full Text	669	0
Standard Tools	Data Extraction - Interactive Evidence Gap Map	282	27
	Methodology	283	0
	Lingo3G clusters	282	0
Administration Tools	Allocations	9343	0
	Full text retrieval	490	0

<https://eppi.ioe.ac.uk/cms/Default.aspx?tabid=2914>



The screenshot shows the EPPI-Reviewer Account Manager page. At the top, there is a navigation bar with the EPPI Centre logo, the text "EPPI-Reviewer", a "LOGIN" button, and a menu with items: HOME, HELP, EPPI-MAPPER, RIS EXPORT, ABOUT, and ACCOUNT MANAGER (highlighted with a red box). Below the navigation bar, the page title is "Account Manager". The main content area is titled "Account and Review Manager". It contains a status field showing "Status: Normal". Below this, there are two sections. The first section is for existing accounts, with a "Login" button (highlighted with a red box) and links for "Forgot your Password?", "Forgot your Username?", and "Need to activate your account?". The second section is for new accounts, with a "New account" button (highlighted with a red box). Below the main content, there is a note about validation emails and a contact email address: eppisupport@ucl.ac.uk. At the bottom, there is a footer with copyright information and a list of navigation links: Home, Help, EPPI-Mapper, RIS Export, About, and Account Manager.

- Create a new account.
- Activate your account.
- Login using your EPPI-Reviewer username and password to manage your account and reviews.
 - ❑ When sharing reviews in particular.
- Forgotten password and username facility.



<https://eppi.ioe.ac.uk/eppireviewer-web>


- Works with modern browsers (Firefox, Safari, Chrome).
- Works on web-enabled devices, e.g. smartphones and tablets.
- Uses the same data as EPPI-Reviewer 4.

EPPI-Reviewer Web (Beta)

Username:

Password:

[Login](#) [Forgot Password?](#)



[Click here to Create your Account.](#)

Visit the [EPPI-Reviewer Gateway](#) for Account and Review Management, Documentation, Support and the RIS export utility. [Follow Us on Twitter](#)

For Cochrane Authors: click [HERE](#) to login with your Cochrane account. [More info...](#)

Latest Changes: Version: 4.14.0.0 24 Jan 2023

Version 4.14.0.0 is a major release, which launches the much awaited for ability to exchange data with Zotero Group Libraries via EPPI-Reviewer Web [Read More...](#)

ePPI REVIEWER Beta

Review home | References | Reports | Search & Classify | Collaborate

Review Items Import Items Manage Duplicates Zotero

Included: **446** Excluded: **6809** Deleted: 3207 Duplicates: **3207**

Coding Progress Coding Tools Refresh Close Check

Screening Tools:

Screening on T&A	✔ 7255	✖ 0
Screening on Full Text	✔ 779	✖ 0

Standard Tools:

Data extraction	✔ 458	✖ 0
------------------------	-------	-----

Administration Tools:

Allocations	✔ 7255	✖ 0
File retrieval	✔ 571	✖ 0

- Based on same tech as Google Docs and Gmail.
- PubMed and OpenAlex integrated.
- Machine learning incl. priority screening

EPPI REVIEWER Beta

Melissa Bond [Logout](#)

[Feedback](#) [Help](#) [Support...](#)

[Review home](#) [References](#) [Reports](#) [Search & Classify](#) [Collaborate](#)

Review Items [Import Items](#) [Manage Duplicates](#) [Zotero](#)

Included: **446** Excluded: **6809** Deleted: 3207 Duplicates: **3207**

Coding Progress [Coding Tools](#) [Refresh](#) [Close](#) [Check](#)

Screening Tools:

Screening on T&A	7255	0
Screening on Full Text	779	0

Standard Tools:

Data extraction	458	0
---------------------------------	-----	---

Administration Tools:

Allocations	7255	0
File retrieval	571	0

Your account expires on: 31 Dec 2023

[Edit Account](#)

Current(shared) review expires on: 31 May 2023.

[Edit Review](#) [Create Review](#) [Setup Visualisations...](#)

[Site Admin...](#) Latest feedback: 25 Jan 2023

Codes

- Quick overview of included, excluded, deleted and duplicate items.
- Can also create a new review from here instead of from the account manager.

Review home | [References](#) | [Reports](#) | [Search & Classify](#) | [Collaborate](#)

Review Items | Import Items | Manage Duplicates

Included: 313 | **Excluded: 0** | Deleted: 10905 | Duplicates: 7

Coding Progress | Coding Tools | Refresh

Screening Tools: | Complete | Incomplete

Screening Tools:	Complete	Incomplete
Screen on Title & Abstract	✓ 7	✗ 124
Steven Startle	✓ 5	✗ 122
Donald Soluable	✓ 2	✗ 124

- Clicking on the name of a coding tool will show the coding progress.
- By clicking on a blue number, you will be taken to a list of those items in the References tab.

My Reviews ↑ My Work ↓ Sources ↓

ID	Review Name	Last Access:
32017	Language Bias in Ed Tech Evidence Synthesis	8 Feb 2023
35930	AI in Education Meta Review	8 Feb 2023
18000	Artificial Intelligence Review	4 Feb 2023
36163	SenseAI Business Review	4 Feb 2023
31584	Learning Analytics & Student Engagement	4 Feb 2023
24034	COVID19 and Higher Education Systematic	31 Jan 2023

↑ Codes ↓

My Reviews ↓ My Work ↑ Sources ↓

Codes to apply	Group	Allocated	Started	Remaining
Screening on T&A	First 100 English studies	100	100	0
Screening on T&A	Rest of the sample - Group 1	174	174	0

Your account expires on: 31 Dec 2023

↑ Codes ↓

My Reviews ↓ My Work ↓ Sources ↑

SOURCES Manage sources Report

Name	Items	Deleted	Duplicates
FIS Bildung Block 1	324	0	1
FIS Bildung Block 4	210	0	85
Web of Science first 1000	1000	0	20
Web of Science second 1000	1000	0	29
Web of Science third 1000	1000	0	24
Web of Science 826	826	0	12
Spanish studies	898	0	0

↑ Codes ↓

My Reviews

- Easily toggle in between reviews you have access to.

My Work

- Displays any coding assignments assigned to you.
- Click on a blue number to go to a list of those items.

Sources


- Lists all imported files.
- Click on Report to produce an itemised record of search meta data.

[Review home](#) | [References](#) | [Reports](#) | [Search & Classify](#) | [Collaborate](#)







[Review Items](#) | **Import Items** | [Manage Duplicates](#) | [Zotero](#)

Included: **446** | [New Reference](#) | **109** | Deleted: 3207 | Duplicates: **3207**




[Manage Sources](#)

Coding Progress | [Coding Tools](#) | 







Screening Tools:

 Screening on T&A	 7255	 0
 Screening on Full Text	 779	 0

Standard Tools:

 Data extraction	 458	 0
--	---	---

Administration Tools:

 Allocations	 7255	 0
 File retrieval	 571	 0

- Importing items is easy

[Manage Sources](#) | **Import Items** | [PubMed](#)

Step 1: Choose file format and select file

Filter

RIS
 PubMed
 RefWorks
 Web of Science
 psycINFO
 OVID RIS

[back](#) | [Show Preview](#)

Step 2: Preview and import:

Results: Total references = 222

Source Name:

Date of search:

Search String (optional):

Database (optional):

Description (optional):


Notes (optional):

[Review home](#) | [References](#) | [Reports](#) | [Search & Classify](#) | [Collaborate](#)







[Review Items](#) | **Import Items** ▼ | [Manage Duplicates](#) | [Zotero](#)

Included: **446** | **109** | Deleted: 3207 | Duplicates: **3207**




[New Reference](#)
[Manage Sources](#)

Coding Progress | [Coding Tools](#) ▼ | 







Screening Tools:

 Screening on T&A	 7255	 0
 Screening on Full Text	 779	 0

Standard Tools:

 Data extraction	 458	 0
--	---	---

Administration Tools:

 Allocations	 7255	 0
 File retrieval	 571	 0

Manually add items

[Save and Close](#) | [Close/back](#)

Ref. Type: Ref. type is REQUIRED | Show optional fields? NO

Title

Abstract

Author(s)

Parent Title

Parent Auth

Year | **Standard Number**

Short Title | **Pages**

Volume | **Issue**

Url

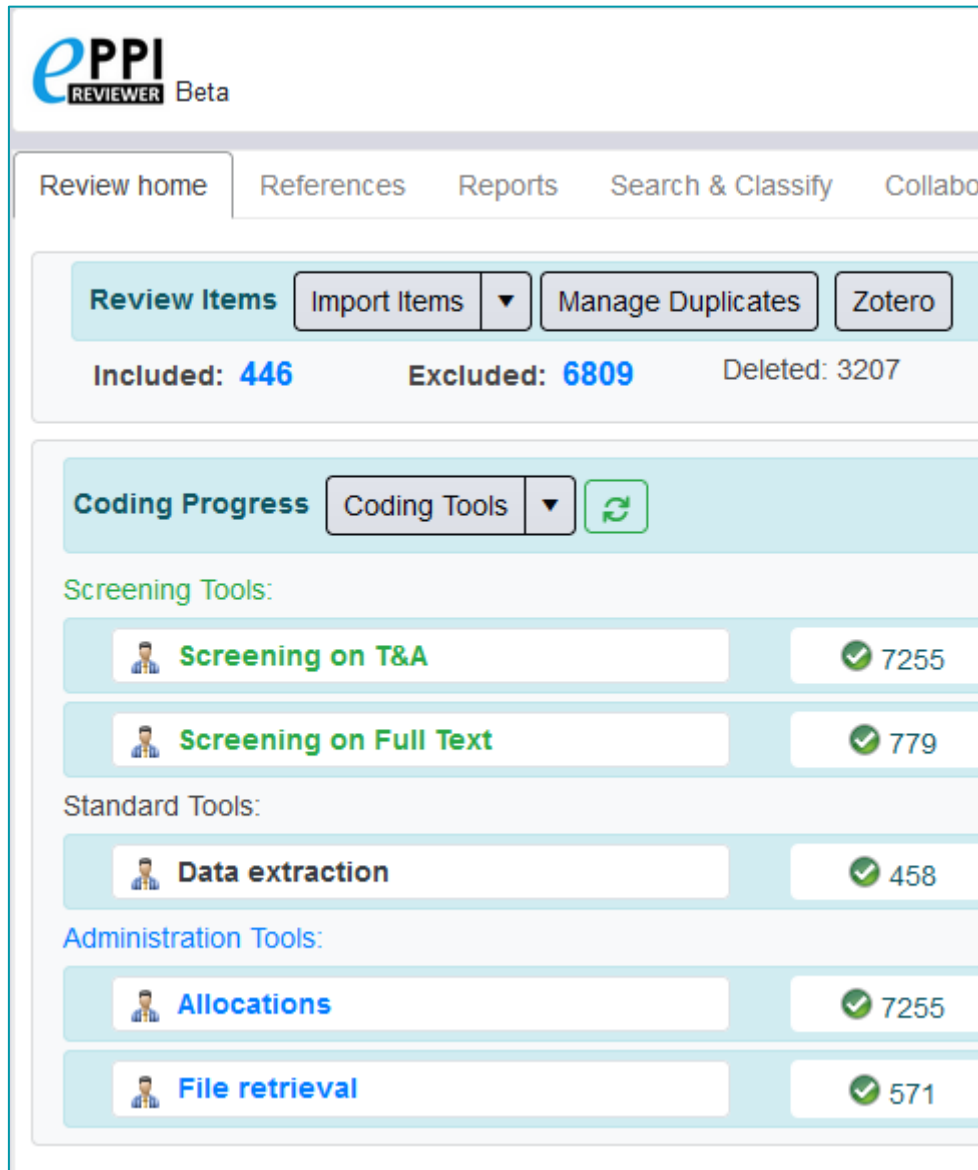
DOI | **Availability**

Edition | **Publisher**

Month | **City**

Country | **Institution**

➤ *Make sure you choose the correct reference type*



EPPI REVIEWER Beta
 Review home | References | Reports | Search & Classify | Collaborate

Review Items | Import Items | Manage Duplicates | Zotero

Included: **446** | Excluded: **6809** | Deleted: 3207

Coding Progress | Coding Tools

Screening Tools:

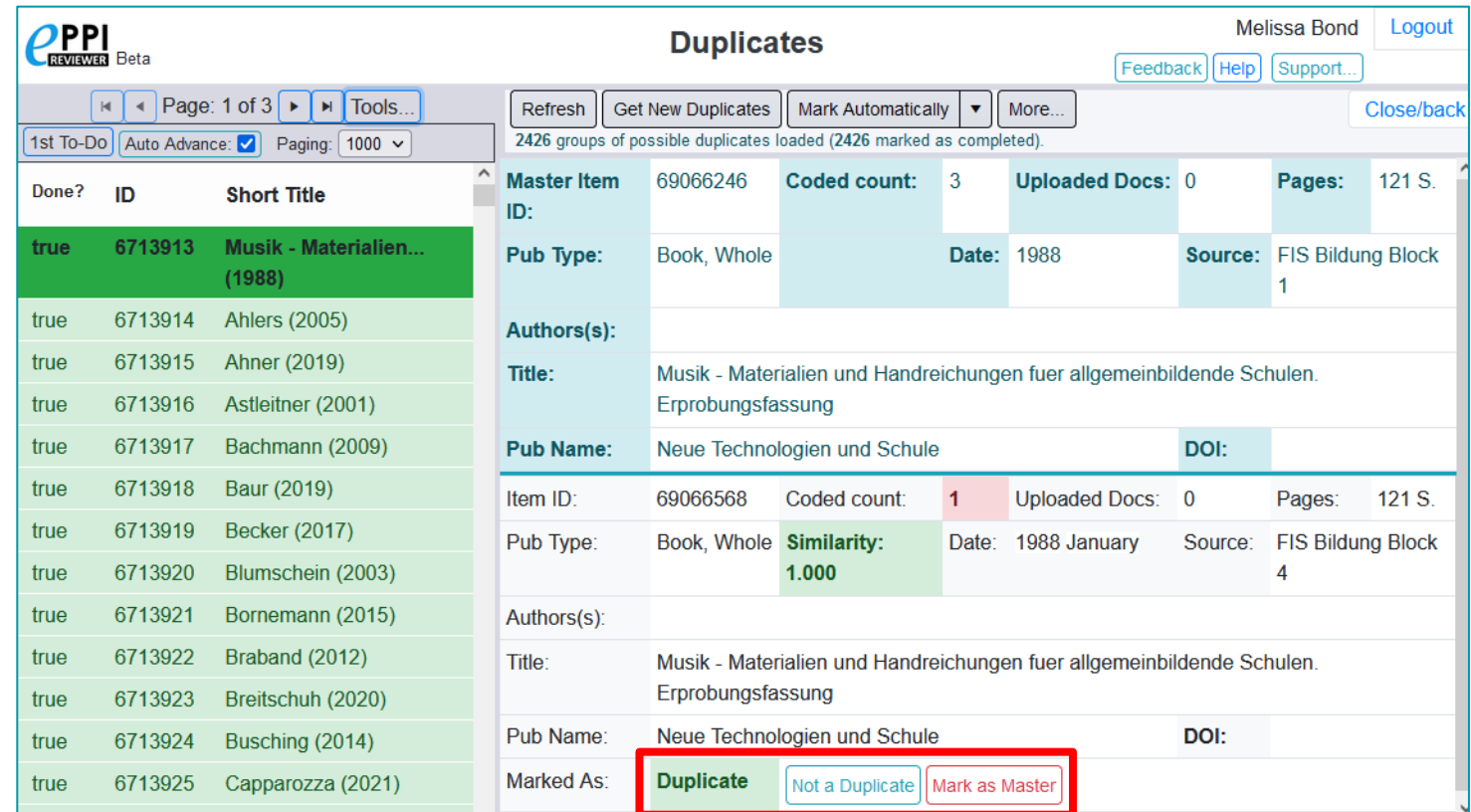
- Screening on T&A: 7255
- Screening on Full Text: 779

Standard Tools:

- Data extraction: 458

Administration Tools:

- Allocations: 7255
- File retrieval: 571



EPPI REVIEWER Beta Duplicates | Melissa Bond | Logout | Feedback | Help | Support...

Page: 1 of 3 | Tools... | Refresh | Get New Duplicates | Mark Automatically | More... | Close/back

2426 groups of possible duplicates loaded (2426 marked as completed).

Done?	ID	Short Title	Master Item ID:	Coded count:	Uploaded Docs:	Pages:
true	6713913	Musik - Materialien... (1988)	69066246	3	0	121 S.
true	6713914	Ahlers (2005)				
true	6713915	Ahner (2019)				
true	6713916	Astleitner (2001)				
true	6713917	Bachmann (2009)				
true	6713918	Baur (2019)				
true	6713919	Becker (2017)				
true	6713920	Blumschein (2003)				
true	6713921	Bornemann (2015)				
true	6713922	Braband (2012)				
true	6713923	Breitschuh (2020)				
true	6713924	Busching (2014)				
true	6713925	Capparozza (2021)				

Item ID: 69066568 | Coded count: **1** | Uploaded Docs: 0 | Pages: 121 S.
 Pub Type: Book, Whole | **Similarity: 1.000** | Date: 1988 January | Source: FIS Bildung Block 4

Title: Musik - Materialien und Handreichungen fuer allgemeinbildende Schulen. Erprobungsfassung
 Pub Name: Neue Technologien und Schule | DOI:

Marked As: **Duplicate** | Not a Duplicate | Mark as Master

- Click **Get New Duplicates** to run the process.
- **Mark Automatically** will speed it up.
- **1st To-Do** takes you to the first possible duplicate in the list.
- Buttons to mark items as duplicate, not a duplicate or master.

EPPI-Reviewer Screening

Add new codes

Edit codes

- Enable *auto advance*
- *Show terms* function highlights key phrases
- Use touch device
- Easy to edit and add codes or extra information

The screenshot displays the EPPI-Reviewer Beta interface. At the top left, the logo and 'Beta' version are visible. The main header is 'Item Details'. On the right side of the header, there are buttons for 'Feedback', 'Help', 'Melissa Bond', and 'Logout'. Below the header, there are navigation buttons: 'First', 'Previous', 'Next', 'Last', and 'Item 2 of 100'. Two buttons, 'Show terms?' (checked) and 'Auto Advance?' (unchecked), are highlighted with red boxes. Below the navigation, there are tabs for 'Item Details', 'Arms and Timepoints', 'PDF', 'Coding Record', and 'Microsoft Academic'. The main content area shows the item details for a 'Journal, Article'. The title is 'Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany'. The abstract text is displayed below the title, with key terms like 'online teaching', 'COVID-19', 'school', and 'teachers' highlighted in green. At the bottom, the author(s) are listed as 'Konig J Jager-Biela, DJ Glutsch, N;'. On the left side of the interface, there is a list of screening criteria with checkboxes and 'Info' links. The criteria include: 'EXCLUDE not in English', 'EXCLUDE duplicate', 'EXCLUDE not K-12', 'EXCLUDE not primary research', 'EXCLUDE not empirical', 'EXCLUDE not related to COVID-19', 'EXCLUDE no education setting', and 'INCLUDE on title & abstract'. Below these, there are sections for 'Screen on Full Text', 'Allocations', 'Data Extraction', and 'Data Extraction 2'.

Show terms? Auto Advance?

OpenAlex

Find on: Show optional fields?

Terms Chan

prediction Google Scholar ve of

(MOOCs) due to the separation of teachers and learners in an extremely important prerequisite to identify potential at-risk emerged a few reviews. However, current reviews of MOOCs of course dropout are not summarized. Secondly, there are challenges are not fully explored. Thus, unlike past reviews, course dropout. Then it proposes an overall framework including machine learning methods and evaluation methods. Finally trajectory modeling are proposed. This study aims to enable the perspective of machine learning.

- ❖ Use Google or Google Scholar to locate PDFs, or click on the blue URL or DOI text.

Url DOI 10.1080/10494820.2022.2124425

Availability

Edition Publisher

Month City

Country Institution Yuncheng Univ, Maths & Informat Technol Sch, Yuncheng, Peoples R China

Comments Times Cited in Web of Science Core Collection: 0
Total Times Cited: 0 Cited Reference Count: 62

Keywords MOOC dropout prediction
online learning
learning behaviors

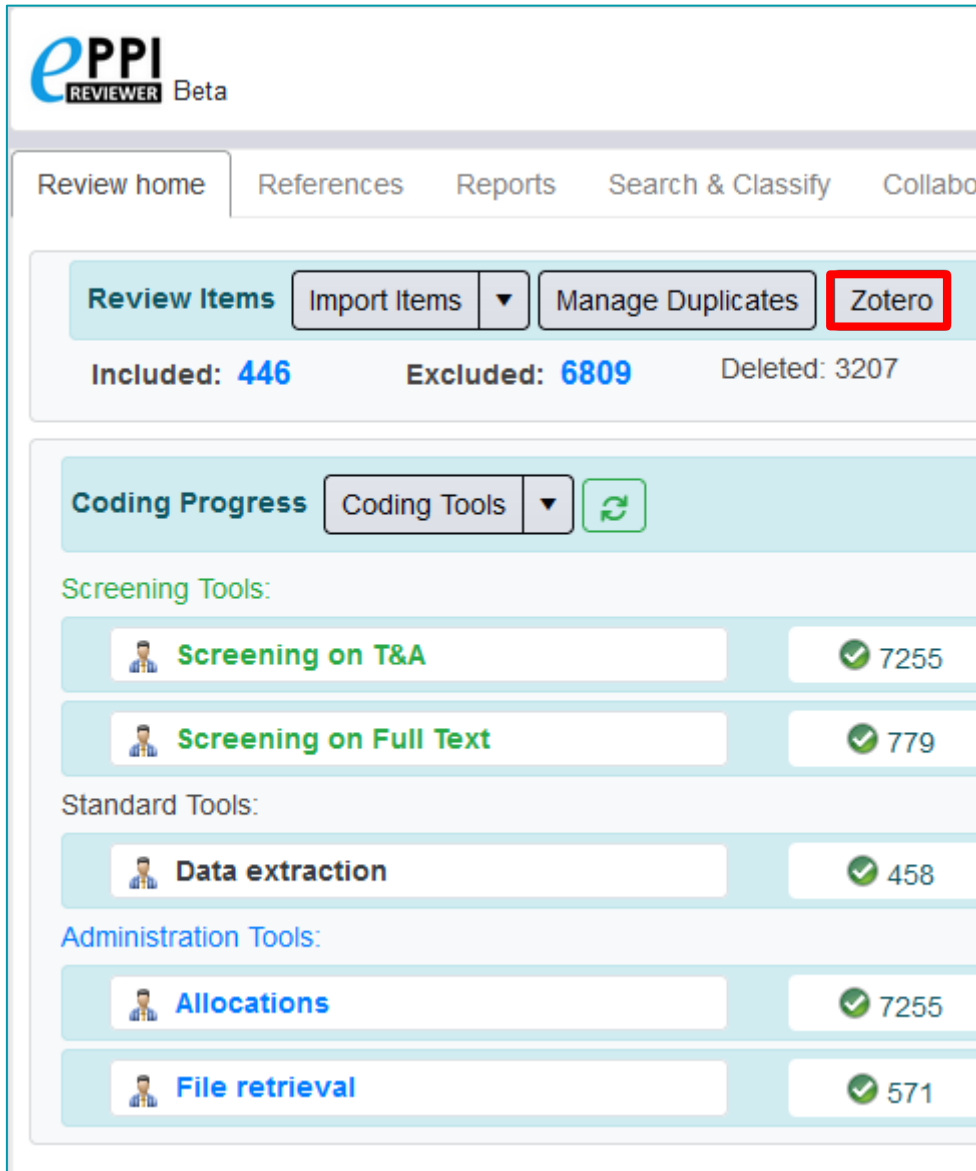
Created by: Melissa Bond Created on: 13/10/2022 Edited by: Melissa Bond Edited on: 13/10/2022
Source: Web of Science Duplicate IDs:

Upload

Documents:

Id	Ref	File Name	Actions
904029	A systematic review... (Chen)	A systematic review for MOOC dropout prediction from the perspective of machine learning.pdf	Download

- ❖ Scroll to the bottom of the item record and click on the blue Upload button.



ePPI REVIEWER Beta

Review home | References | Reports | Search & Classify | Collaborate

Review Items | Import Items | Manage Duplicates | **Zotero**

Included: 446 | Excluded: 6809 | Deleted: 3207

Coding Progress | Coding Tools

Screening Tools:

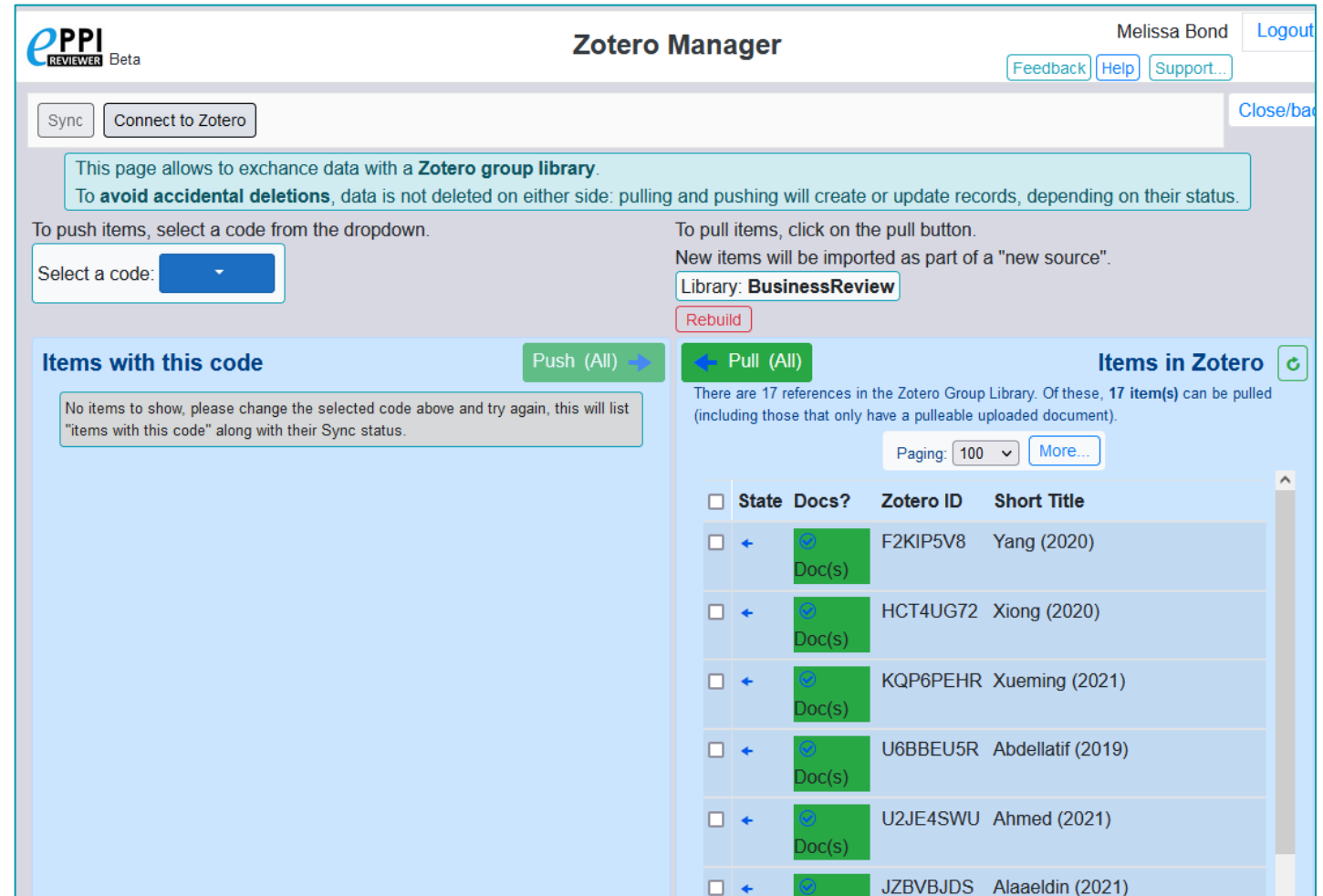
- Screening on T&A: 7255
- Screening on Full Text: 779

Standard Tools:

- Data extraction: 458

Administration Tools:

- Allocations: 7255
- File retrieval: 571



Zotero Manager | Melissa Bond | Logout | Feedback | Help | Support...

Sync | Connect to Zotero

This page allows to exchange data with a **Zotero group library**.
 To **avoid accidental deletions**, data is not deleted on either side: pulling and pushing will create or update records, depending on their status.

To push items, select a code from the dropdown.
 Select a code:

To pull items, click on the pull button.
 New items will be imported as part of a "new source".
 Library: **BusinessReview**
 Rebuild

Items with this code | Push (All)

No items to show, please change the selected code above and try again, this will list "items with this code" along with their Sync status.


Items in Zotero | Pull (All)














There are 17 references in the Zotero Group Library. Of these, 17 item(s) can be pulled (including those that only have a pulleable uploaded document).
 Paging: 100 | More...

<input type="checkbox"/>	State	Docs?	Zotero ID	Short Title
<input type="checkbox"/>	←	✓ Doc(s)	F2KIP5V8	Yang (2020)
<input type="checkbox"/>	←	✓ Doc(s)	HCT4UG72	Xiong (2020)
<input type="checkbox"/>	←	✓ Doc(s)	KQP6PEHR	Xueming (2021)
<input type="checkbox"/>	←	✓ Doc(s)	U6BBEU5R	Abdellatif (2019)
<input type="checkbox"/>	←	✓ Doc(s)	U2JE4SWU	Ahmed (2021)
<input type="checkbox"/>	←	✓ Doc(s)	JZBVBJDS	Alaaeldin (2021)

- Link to a Zotero Group Library and bulk import PDFs.
 - *Only free for up to 300MB*

- Complex coding tools supported
- Both quantitative and qualitative codes
- Coding tools allow for multi-stage reviews to occur within the one review
- Consider your coding tool first, if you're going to create EGMs

- ▼  Data Extraction
 - ▶ Publication Type
 - ▶ Methodology
 - ▶ Setting/Context
 - ▶ Population
 - ▶ Our research questions
 - ▶ Intervention
- ▼ Outcomes
 - ▶ Student
 - ▶ Parent engagement
 - ▶ Peers
 - ▶ Learning environment & technology
 - ▶ Curriculum/Activities
 - ▶ Cognitive engagement
 - ▶ Affective engagement
 - ▶ Behavioural engagement
 - ▶ Cognitive disengagement

- ▶  Screen on Title and Abstract
- ▶  Screen on Full Text
- ▶  Living EGM
- ▶  Data Extraction
- ▶  IPPO EGM
- ▶  IPPO Quality Assessment
- ▶  IPPO Screen on Title and Abstract
- ▶  IPPO Screen on Full Text
- ▶  IPPO Final Inclusion/Exclusion
- ▶  IPPO - Respondent Info
- ▶   Lingo3G clusters
- ▶  Allocations

- ▶ Geographical focus of the review
- ▶ Focus of AI review
- ▶ Educational Context searched for
- ▶ Specific participant focus/setting
- ▶ Methodological questions
- ▼ Quality Assessment
 - ▼ Are there any research questions, aims or objectives?

Yes - use highlight tool
 Partly
 No
 - ▶ Were inclusion/exclusion criteria provided in the method section?

(4) Some key challenging problems including interpretability, imbalanced data, especially the semantic learning trajectory modeling are proposed in this review.

In short, this study provides a systematic and comprehensive understanding of MOOC dropout prediction which helps researchers to capture the whole picture of the issue to be studied. Moreover, researchers can quickly understand the problem definition, general process and methods, and the corresponding references.

2. Methodology

2.1. Framework of dropout prediction

This review proposes a systematic frame... learners' dropout prediction using various machine learning methods. Due to the di... learning behaviors and large-scale data, the definition of dropout, the detailed process from the raw data to predictive results need to be represented clearly. Thus, we focus on the following research questions: (1) What kinds of factors may affect dropout and how to extract those kinds of features? (2) What kinds of machine learning methods have been applied for dropout prediction? (3) How to evaluate the performance of predictive results? (4) What are the key challenges in current studies? The overall framework for the above research questions is shown as in Figure 1.

Specifically, MOOC platforms record various types of raw learning data which enable the research to be carried out. Firstly, three definitions are summarized from most of the current studies. Secondly, the learning factors that influence course dropout have been explored and classified. The feature extraction methods for the two main types of learning data (clickstream data and text

Coding report

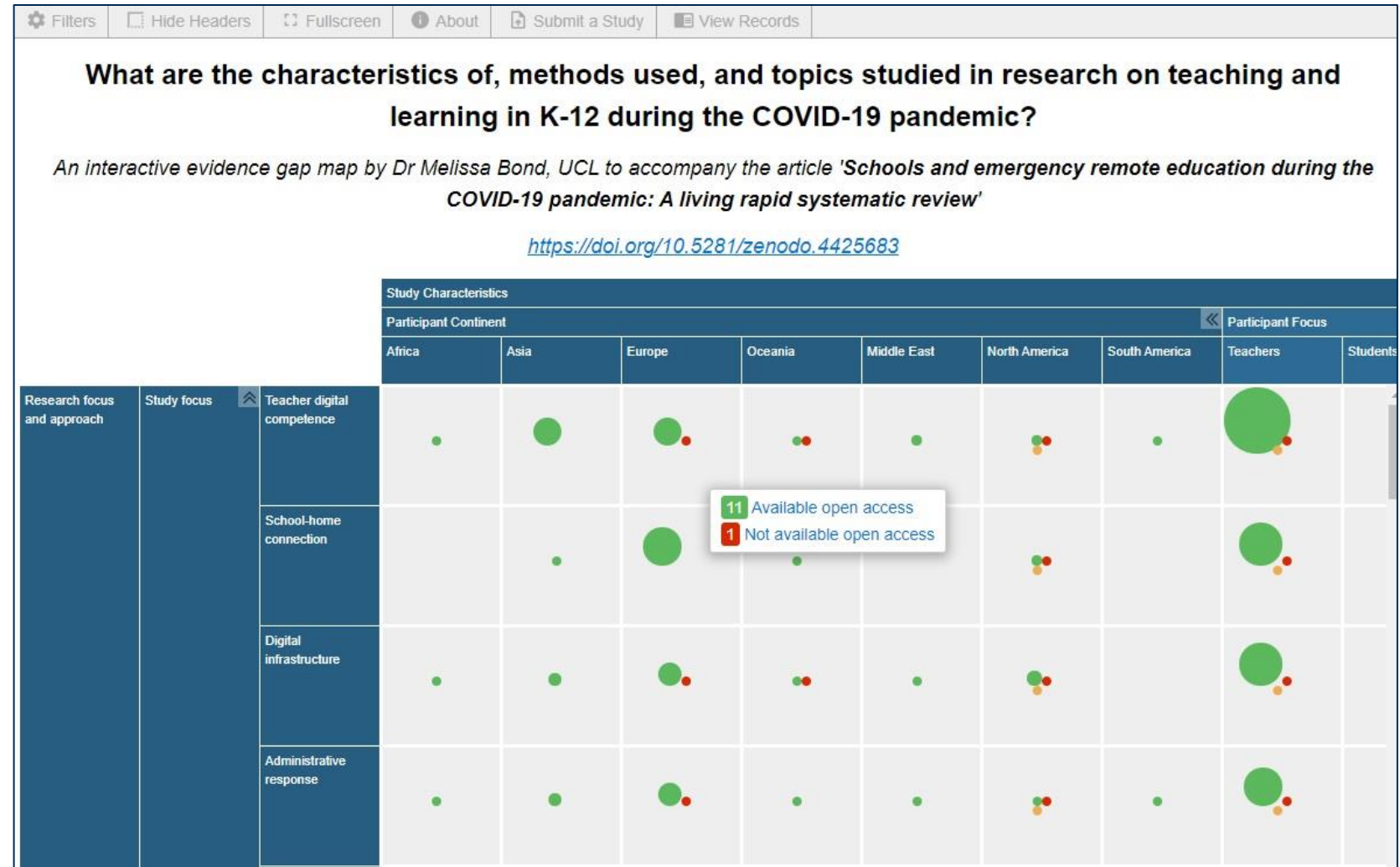
Text entered via Info box

- Quality Assessment
 - Are there any research questions, aims or objectives?
 - Yes - use highlight tool
 A systematic review for MOOC dropout prediction from the perspective of machine learning.pdf: Page 4: "(1) What kinds of factors may affect dropout and how to extract those kinds of features? (2) What kinds of machine learning methods have been applied for dropout prediction? (3) How to evaluate the performance of predictive results? (4) What are the key challenges in current studies?"
 - Were inclusion/exclusion criteria provided in the method section?
 - Partly
 - Are the publication years included defined?
 - Yes
 2012-2022

Assigned text from PDF

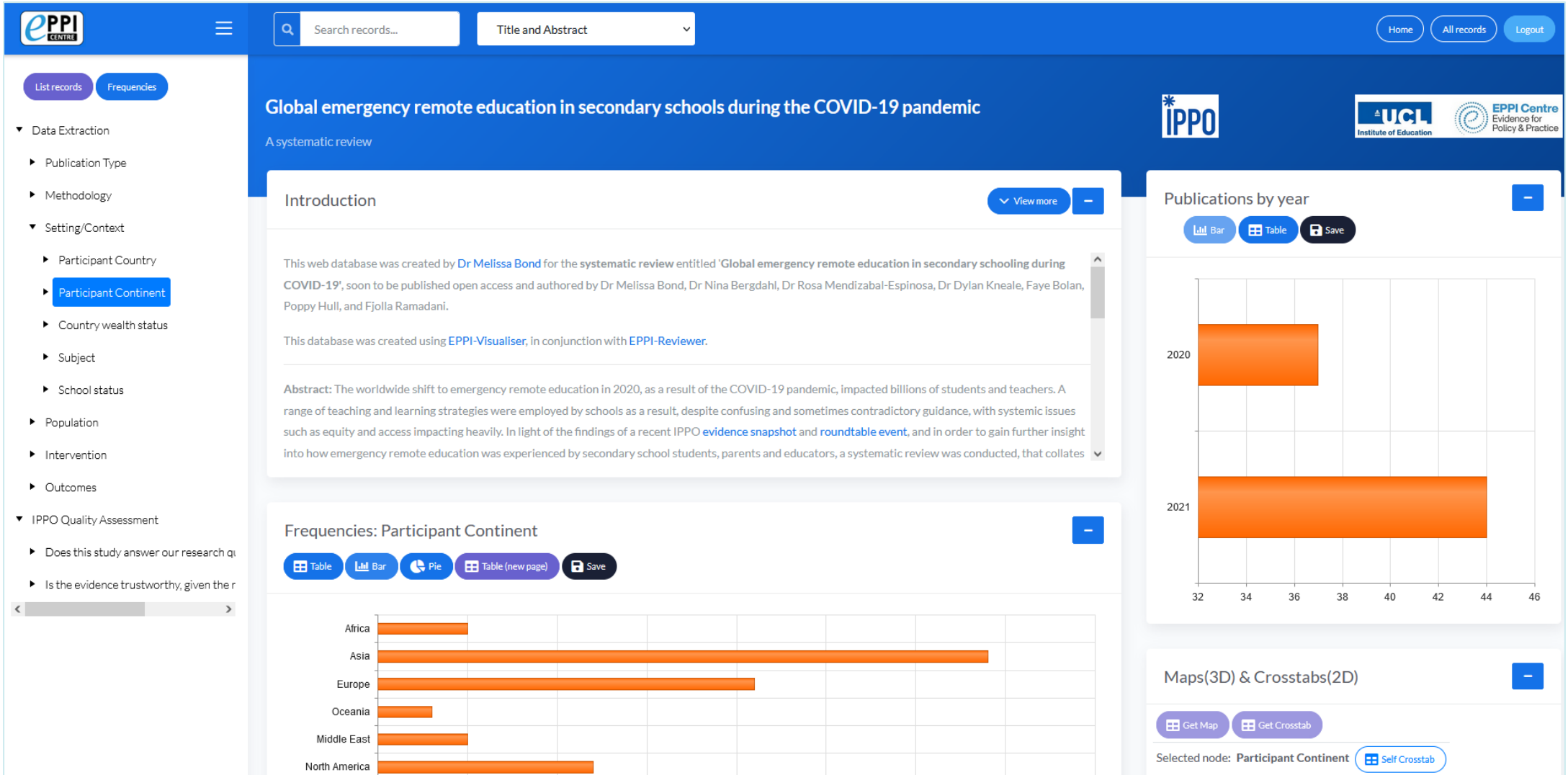
- Created for each research question
- Freely available open access
- Filterable, searchable
- Can download references
- Direct links to studies
- Can assist synthesis

<https://eppi.ioe.ac.uk/cms/Default.aspx?tabid=3794>



EPPI-Visualiser is a new web database tool, displaying the studies and coding conducted in your review.

- Any changes made in your review are updated live in the database.




The screenshot displays the EPPI-Visualiser interface for a systematic review. The main content area shows the 'Introduction' section, which includes the title, author information (Dr Melissa Bond), and a brief description of the database's purpose. Below the introduction is an 'Abstract' section. To the right, there is a 'Publications by year' chart showing the number of publications for 2020 and 2021. At the bottom, there is a 'Frequencies: Participant Continent' chart showing the distribution of participants across different continents.

Publications by year

Year	Number of Publications
2020	37
2021	44

Frequencies: Participant Continent

Continent	Frequency
Africa	10
Asia	45
Europe	38
Oceania	5
Middle East	10
North America	25



Update review

[Feedback](#)
[Help](#)
[Support...](#)
Melissa Bond
[Logout](#)

← →

Bring up-to-date
Keep up-to-date
Match records
Search and browse
OpenAlex Admin
Selected
Show History

[Close/back](#)

Autoupdate last run on: 2023-01-04 Matched items: 2545


Bring review up to date (find related papers)

more details ▾

Add new search for related papers ▾

Related Paper Searches ↻

Description	Mode	Date from	Date run	All included	With this code	Status			
Citation checking	Cited by	1 Jan 2018	31 Oct 2022	<input type="checkbox"/>	INCLUDE on title & abstract	Complete	Imported		Import 1621
Bidirectional checking	Bi-Citation AND Recommendations	1 Jan 2018	31 Oct 2022	<input type="checkbox"/>	INCLUDE on title & abstract	Complete	Not imported		Import 3752
Bidirectional checking	Bi-Citation AND Recommendations	1 Jan 2018	31 Oct 2022	<input checked="" type="checkbox"/>	INCLUDE on title & abstract	Complete	Not imported		Import 3752
Citation checking	Cited by	1 Nov 2022	2 Jan 2023	<input type="checkbox"/>	INCLUDE on full text	Complete	Imported		Import 125
Biblio on new imports	Bibliography	1 Jan 2018	2 Jan 2023	<input type="checkbox"/>	New manual import 2 Jan 2023	Complete	Not imported		Import 421
Biblio on all included	Bibliography	1 Jan 2018	2 Jan 2023	<input type="checkbox"/>	INCLUDE on full text	Complete	Not imported		Import 3544
Bidirectional checking	Bi-Citation AND Recommendations	1 Nov 2022	2 Jan 2023	<input type="checkbox"/>	INCLUDE on full text	Complete	Not imported		Import 135
Biblio of second opinion	Bibliography	1 Jan 2018	2 Jan 2023	<input type="checkbox"/>	INCLUDE for second opinion	Complete	Not imported		Import 610
Citations	Cited by	2 Jan 2023	9 Jan 2023	<input type="checkbox"/>	INCLUDE on full text	Complete	Not imported		Import 3
Citations	Cited by	1 Jan 2023	16 Jan 2023	<input type="checkbox"/>	INCLUDE on full text	Complete	Not imported		Import 38
Citations	Cited by	16 Jan 2023	26 Jan 2023	<input type="checkbox"/>	INCLUDE on full text	Complete	Not imported		Import 21



Update review

[Feedback](#)
[Help](#)
[Support...](#)
Melissa Bond
[Log](#)

← →

Bring up-to-date
Keep up-to-date
Match records
Search and browse
OpenAlex Admin
Selected
Show History

Close/

Autoupdate last run on: 2023-01-04 Matched items: 10117

Keep review up-to-date (subscribe review to auto-updates)

more details ▾

Create new auto-update subscription ▾

Auto update tasks (they run when new data arrive) 🔄

Description	All included?	Only with this code?
New items based on original review	false	Review as of 8 Jan 2021 🗑️

Items found at each task execution

Description	All included?	With this code	"Study Type" classifier	User Classifier	Version	Date	
New items based on original review	false	Review as of 8 Jan 2021			2023-01-04	5 Jan 2023	Refine/Import 🗑️
New items based on original review	false	Review as of 8 Jan 2021			2022-11-14	8 Dec 2022	Refine/Import 🗑️
New items based on original review	false	Review as of 8 Jan 2021			2022-10-10	15 Oct 2022	Refine/Import 🗑️
New items based on original review	false	Review as of 8 Jan 2021			2022-10-10	15 Oct 2022	Refine/Import 🗑️
New items based on original review	false	Review as of 8 Jan 2021			2022-08-31	14 Sept 2022	Refine/Import 🗑️
New items based on original review	false	Review as of 8 Jan 2021			2022-05-28	3 Aug 2022	Refine/Import 🗑️

Hands-on Activities

You can choose to just have a look around yourself, ask questions, or you can choose to complete a pre-prepared hands-on task:

- [Hands-on practice task #1](#)
- [Hands-on practice task #2 – Education specific](#)
- [Setting up a shared review](#)
- [Setting up a data-extraction coding tool](#)
- [Setting up coding assignments](#)



Folder link:

<https://drive.google.com/drive/folders/1BiC8YwnwrmHi5IzIR4j7JyVMA9WkCnBI?usp=sharing>

Further information

[EPPI-Reviewer Account Manager](#) – sign up to a free one month trial.

- ▶ [Importing references](#) into EPPI-Reviewer
- ▶ [Managing duplicates](#) in EPPI-Reviewer
- ▶ [Editing codes and coding tools](#)
- ▶ [Creating reference groups and allocating coding assignments](#)
- ▶ [Understanding data entry modes, double coding and reconciliation](#)
- ▶ [Pushing items from EPPI-Reviewer to Zotero and importing bulk PDFs](#)
- ▶ [Line by line PDF coding](#)
- ▶ [Creating a comparison report](#)
- ▶ [Using the Reports tab](#)
- ▶ [Introduction to interactive evidence gap maps](#)
- ▶ [Creating an interactive EGM using EPPI-Mapper](#)
- ▶ [Introduction to EPPI-Visualiser](#)

Contact Information

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- Website: <http://drmelissabond.weebly.com/>
- ResearchGate: <https://www.researchgate.net/profile/Melissa-Bond-5>
- LinkedIn: <https://www.linkedin.com/in/bondmelissa/>
- YouTube: <https://www.youtube.com/user/EPPIReviewer4>

- Bedenlier, S., Bond, M., Buntins, K., Zawack-Richter, O., & Kerres, M. (2020). Learning by doing? Reflections on conducting a systematic review in the field of educational technology. In O. Zawacki-Richter, M. Kerres, S. Bedenlier, M. Bond, & K. Buntins (Eds.), *Systematic reviews in educational research: Methodology, perspectives and application*. Heidelberg: Springer Open, Verlag für Sozialwissenschaften. https://doi.org/10.1007/978-3-658-27602-7_7
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