Understanding Systematic Literature Review(SLR)

Dr Shriram Pandey,
Associate Professor & Head, DLISc, Central University of Haryana

Learning Outcomes

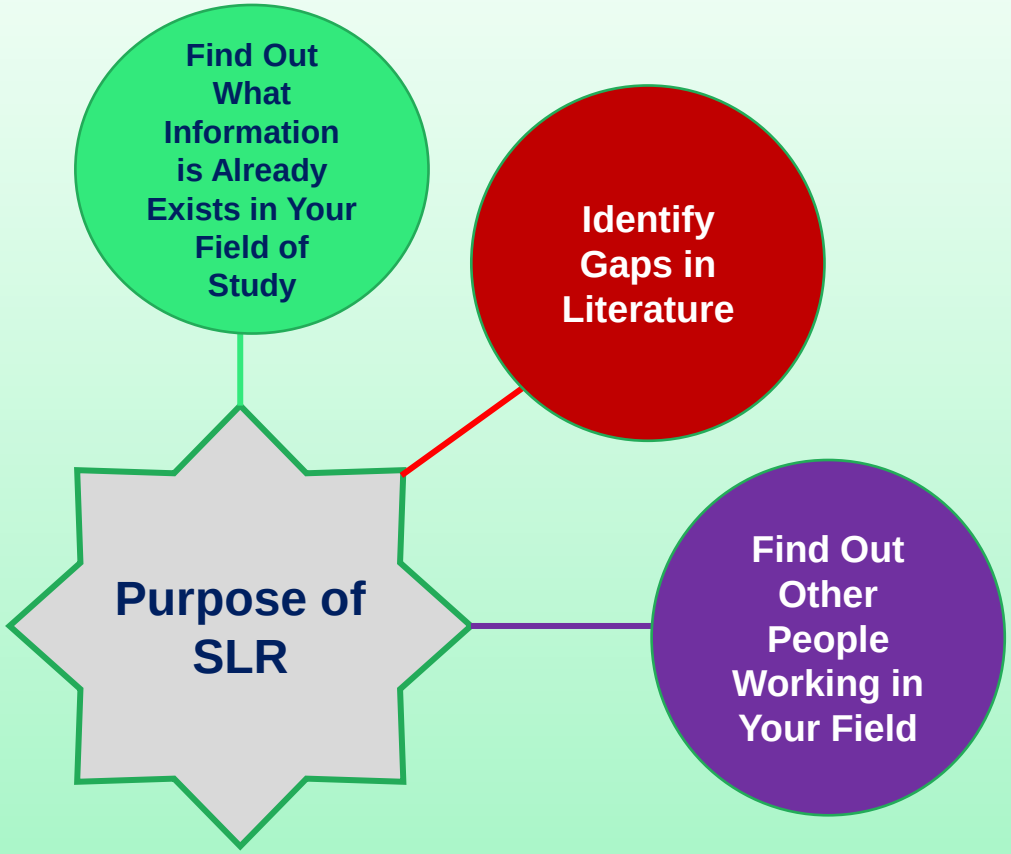
01 Purpose of LR and SLR

02 Fundamental of LR & SLR
SRL Paper Format

03 Techniques and guidelines for SLR

04 Analyzing & Interpretations the data Using

Purpose of Systematic Literature Review?

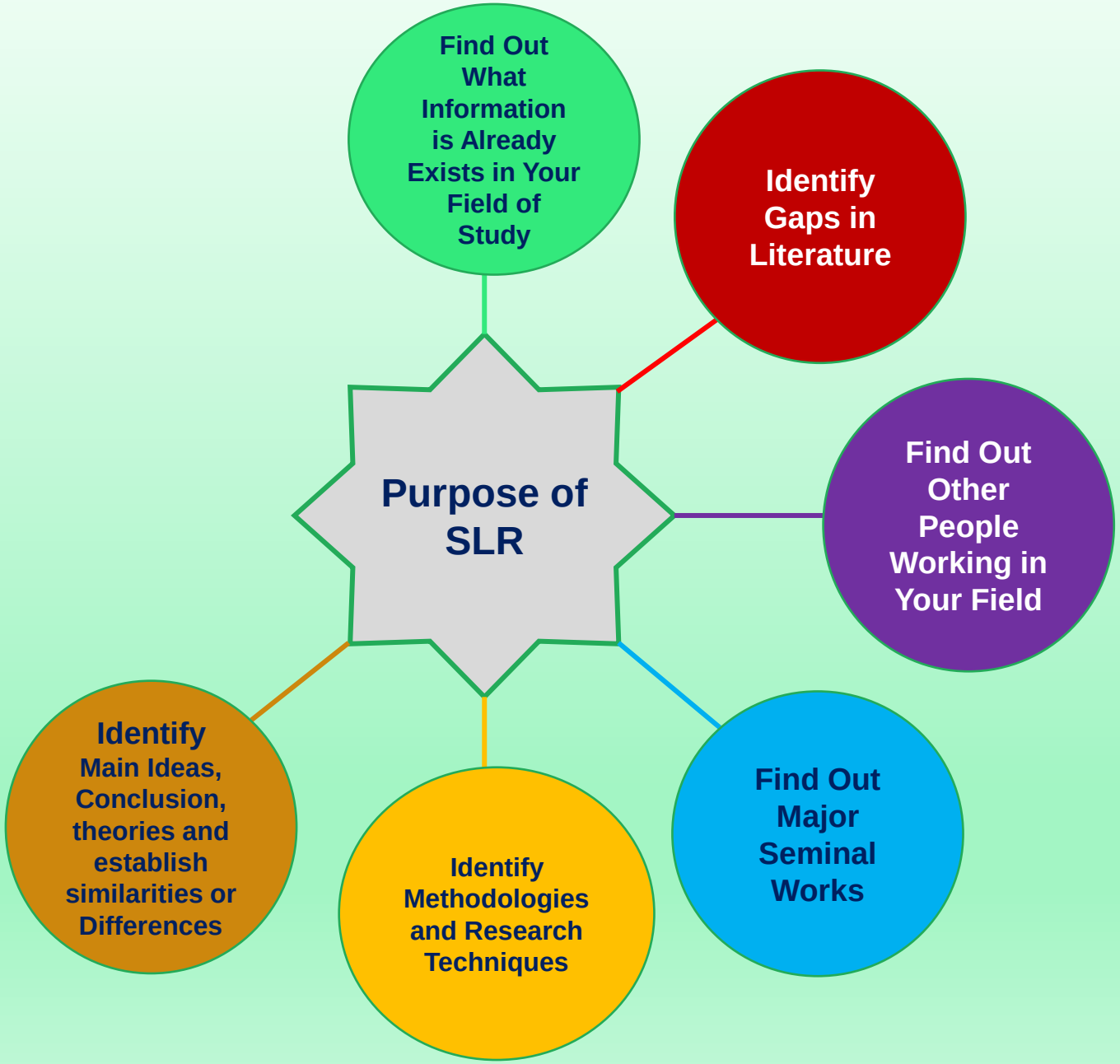


- **Find Out What Information Already Exists in Your Field of Study**
- It provides a historical background for your research

- **Identification of Gaps in the Literature.**
- Through Literature review, the researcher establishes what has been done and what is lacking in terms of methods, tools or techniques which effect results

- **Find Out Who are other people working in your research area**
- It helps in establishing networks and a channel of collaborative research

Purpose of Systematic Literature Review?



- **Find Out Major Seminal Works**
- It helps in identifying strongly influencing later developments

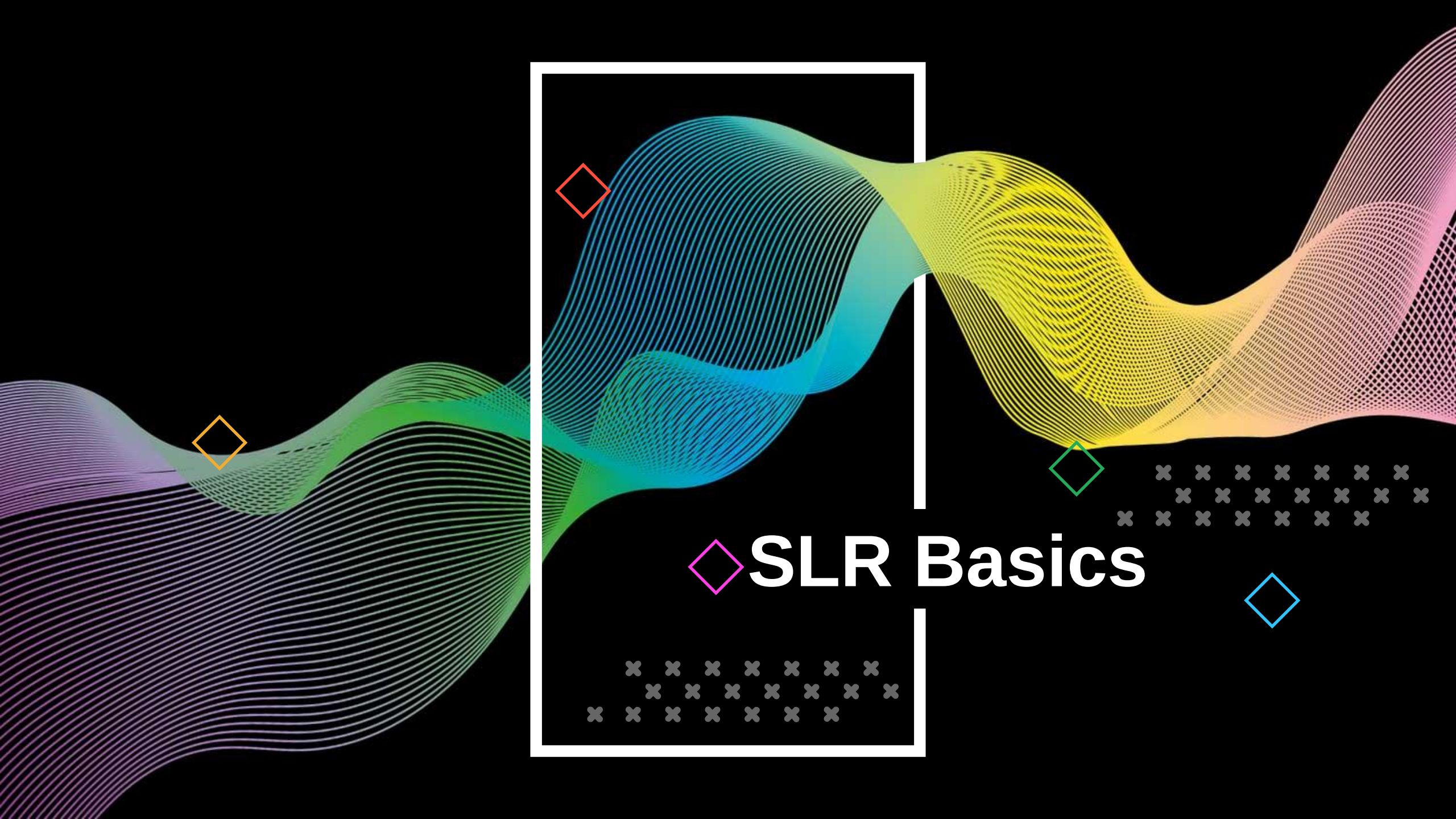
- **Identify Methodologies and Research Techniques**
- Identifies techniques for determining if the reported results
- **It helps to identify various methods used to solve a problem**

- **Identify Main Ideas, Conclusion, and Theories**
- Through Literature Review Establish Similarities and Differences in Research Process

Purpose of Systematic Literature Review?

- **Provide Context of Your Research**
- The context includes the methodological quality and other study characteristics

- **Show Relationship with Previous Studies**
- The context of previous work, future analysis can be possible with improved tools, methods, or results
- It provides supporting evidence for a practical problem or issue which your research is addressing thereby underlining its significance.


SLR Basics

What is SLR: View Points

1 Literature Review

- Traditional expert review; usually subjective in nature
- Identify, summarize and evaluate the current theory and practices
- Providing evidence and supporting policy development
- Thematic, evolution and chronology of development

Systematic Literature Review 2

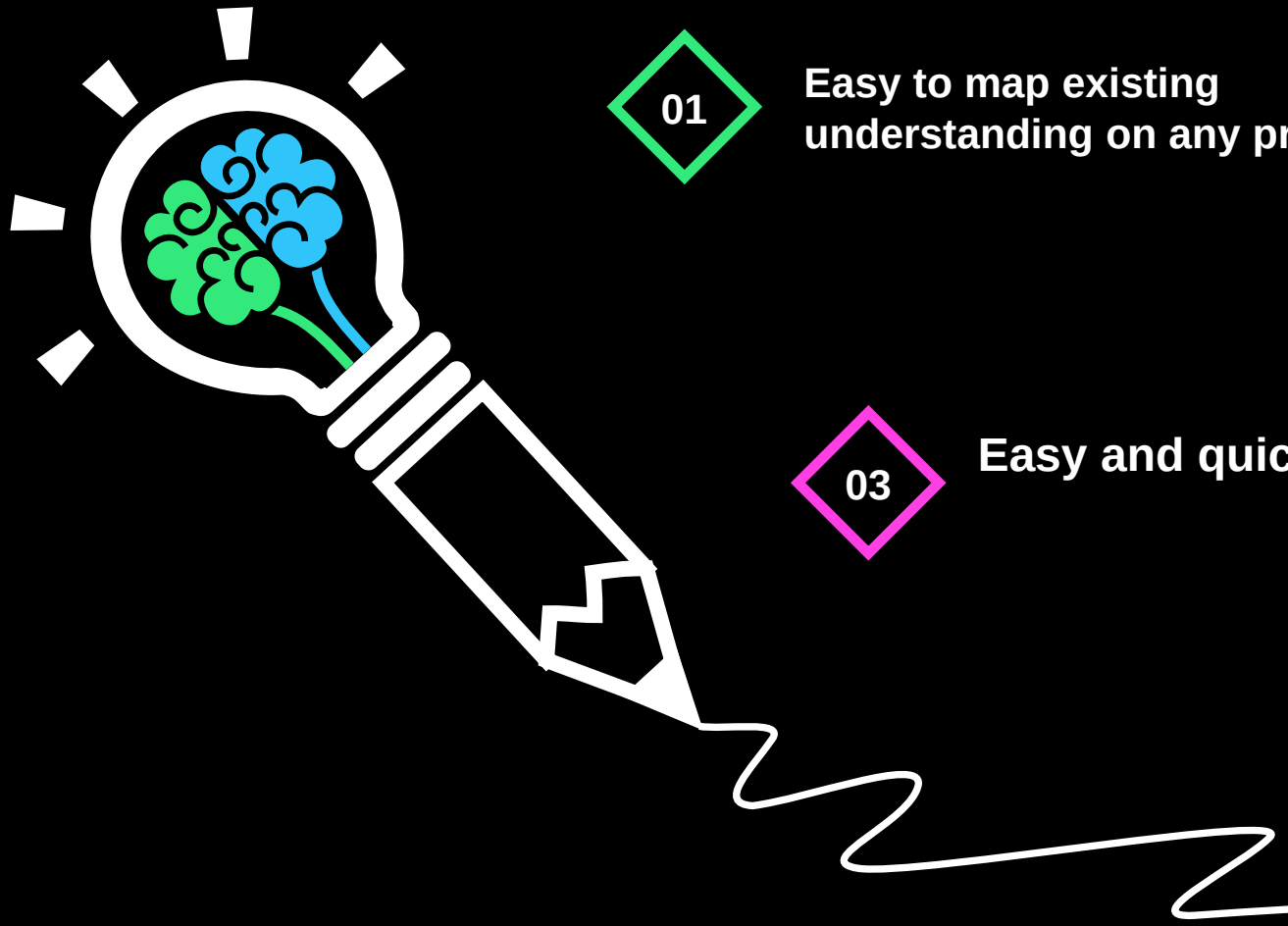
- A systematic review is a summary of the research literature that is focused on a research question.
- It is conducted in a manner that tries to identify, select, appraise and synthesize all high quality research evidence relevant to that question.
- SLR reduce biases, increased reliability and potentially improve the communications of the findings
- Descriptive Analysis & Literature Classifications

Meta Analysis 3

- SLR+ Statistical Methods
- Use of statistical methods to combine the results of various independent, similar studies
- More precise calculation of one estimate of treatment effect than could be achieved by any of the individual, contributing studies.
- Relationship and Correlation analysis

	Systematic Literature Reviews	Traditional Literature Reviews
Need	If you want to answer a question	Often part of empirical studies or papers
Research Protocol	Required	Not required
Research Selection Process	Structured and Replicable	Not Structured or Replicable
Evaluation Process	Uses a protocol / objective	Researcher's choice / subjective
Data Extraction Process	Uses a protocol / objective	Researcher's choice / subjective
Research Synthesis	Framework / Knowledge Map	
Time	Very long	Relatively Short
Reason	Finding a answer	Background research for empirical studies

Why SLR is Important



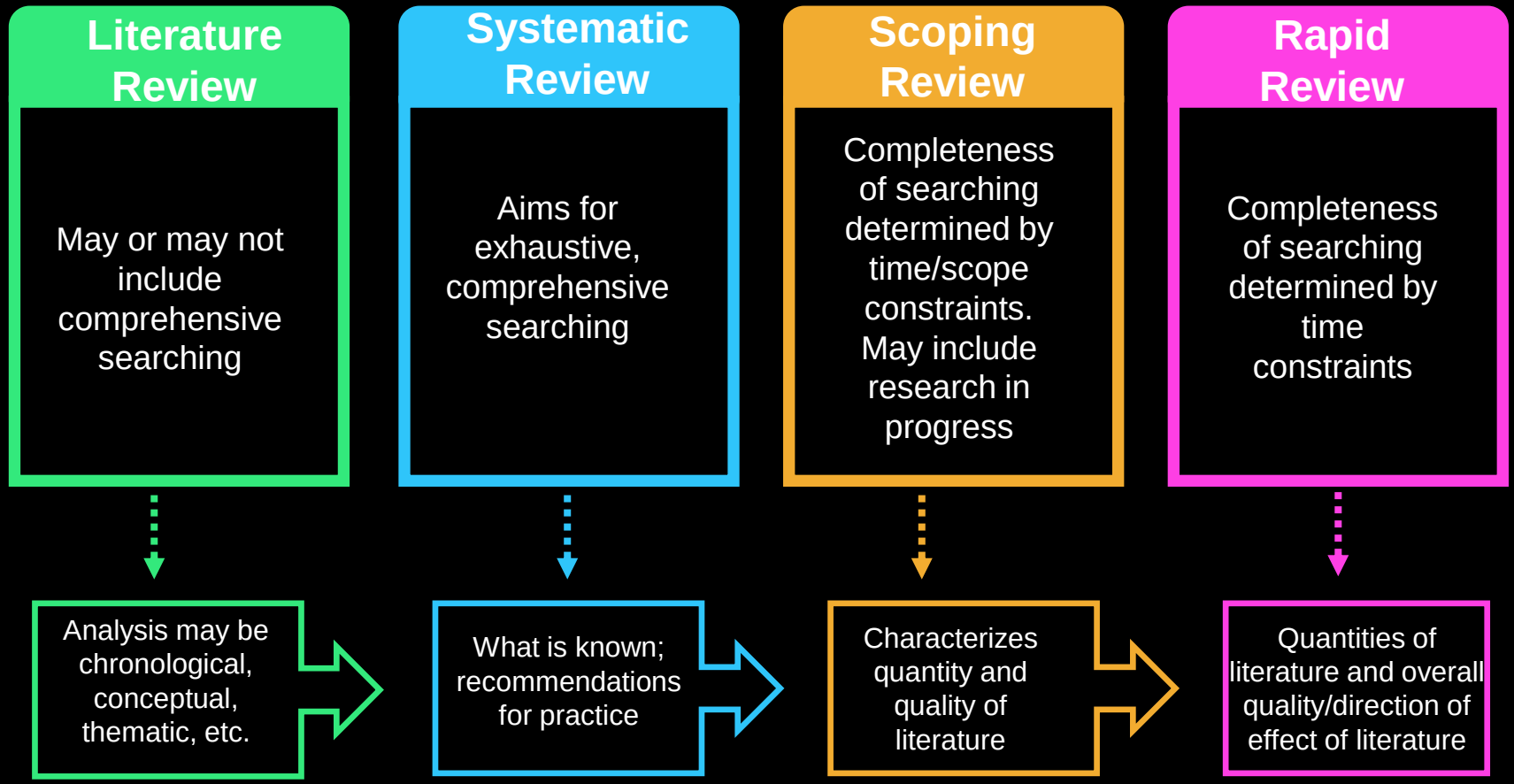
01 Easy to map existing understanding on any problem

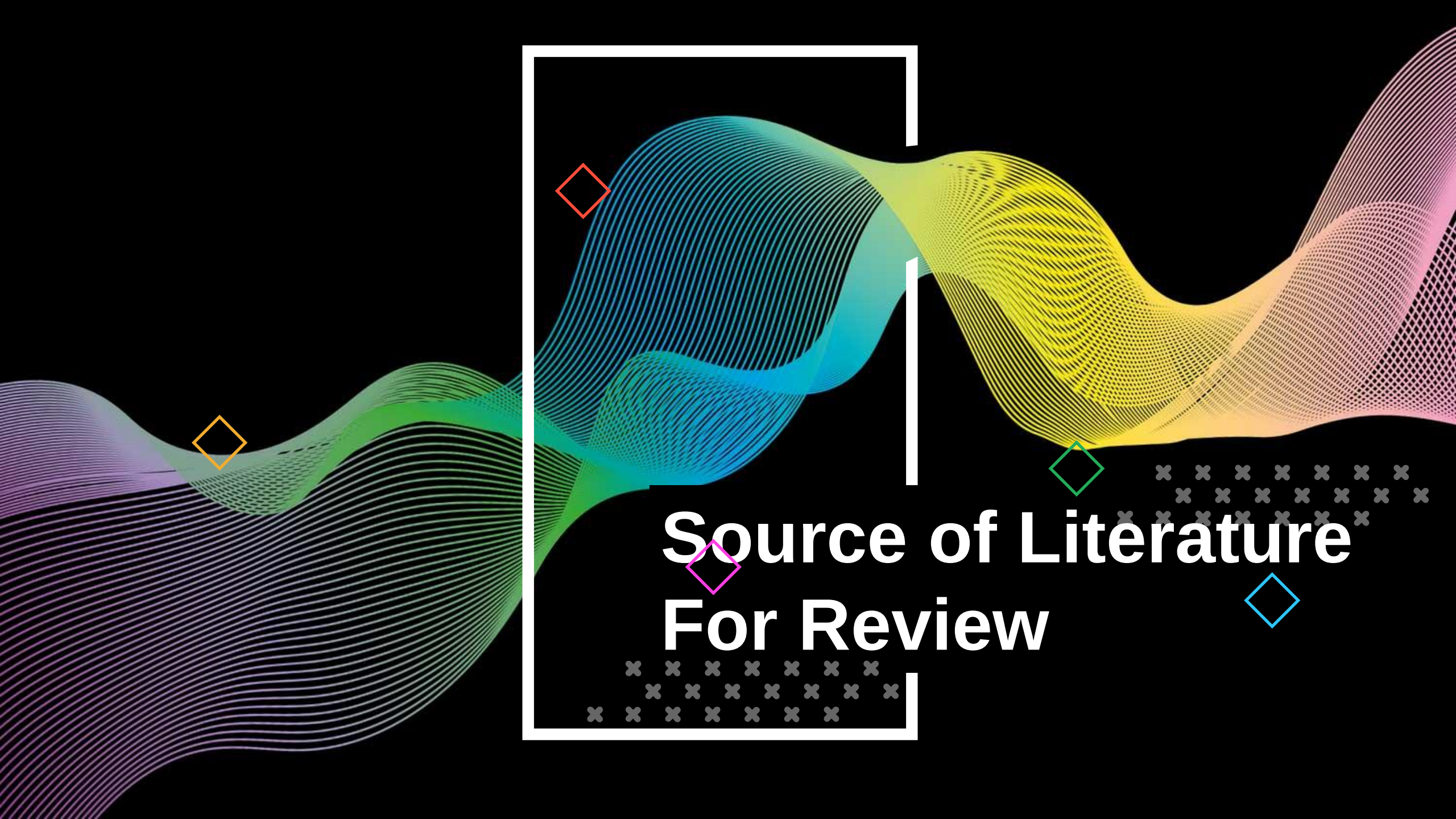
02 Rigorous Scientific Methodology

03 Easy and quick inferences

04 Easy to Publish & Highly Cited

Types of Literature Reviews




Source of Literature
For Review

Searching Literature

Recency	*Years*	*Months*	*Weeks*	*Days*	*Current*
Resource Type	Books, monographs, dissertations, and reference works	Journals and periodicals	Popular and trade magazines	Newspapers	Websites and blogs
Content Type	Theoretical foundations, definitions, research, key concepts, and constructs	Recent research, theoretical discussion, and debate	Current issues, debates, applications, practices, and field problems	Current issues, debates, and field problems	Up-to-date issues, debates, practices, and applications

Literature type	Database
Books, subjects, authors	• Library catalogs • Online public access catalogs
Refereed journals, subject periodicals	• Library based and online subject indices and abstracts
Theses and dissertations	• Dissertation abstracts
Trade magazines, popular magazines, newspapers	• Online indices • Web query
Websites and blogs	• Online search engines and databases

SLR

Select a Data Source (Bibliographic Databases, Website)

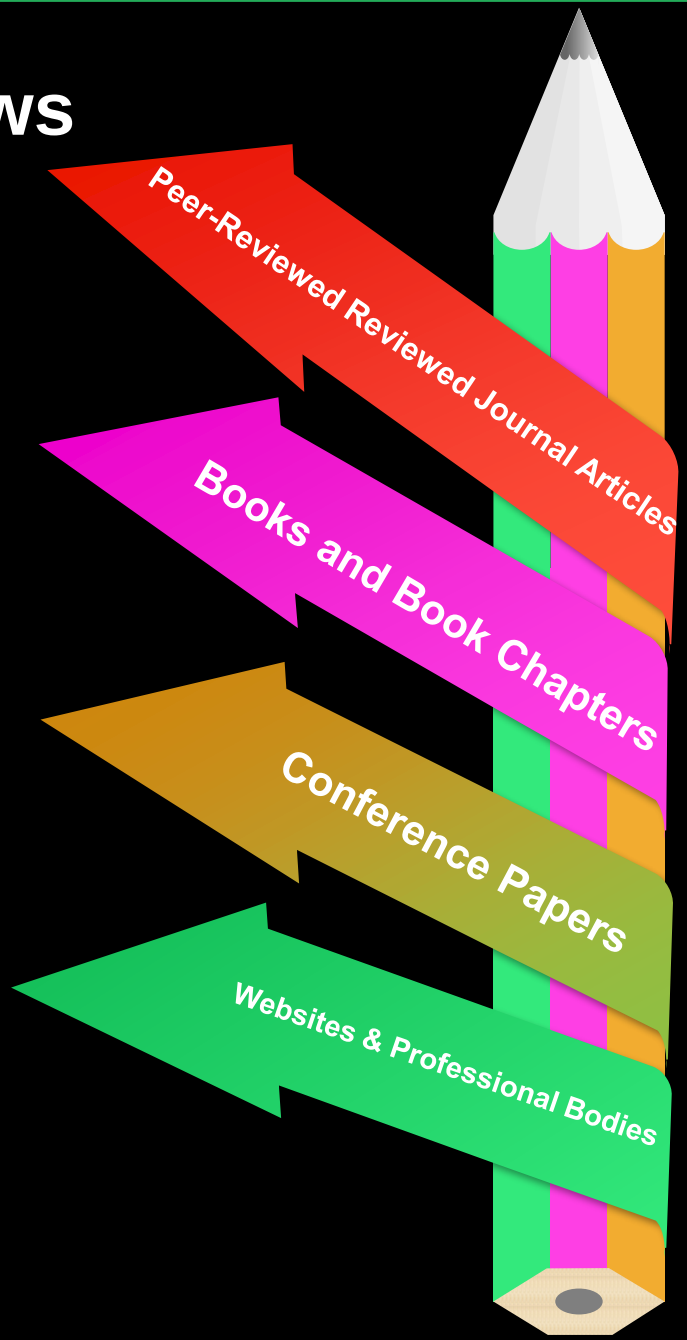
Acceptable Sources for Literature Reviews

Peer Reviewed Journal Articles
Published by Journals and Indexed by Major Databases

Books and Book Chapters
May be Available as Text Books or Reference Books (Encyclopedia, Handbooks, etc)

Conference Papers
Discipline Specific Conferences, Seminar, Symposia, Workshops etc

Websites & Professional Bodies
Wikipedia, Policy Documents, Patents, etc




Identifying the Database and Search Strategy

Comparison of databases/platforms

Received: 2 November 2018 | Revised: 7 August 2019 | Accepted: 6 September 2019

DOI: 10.1002/jrsm.1378

RESEARCH ARTICLE

WILEY

Which academic search systems are suitable for systematic reviews or meta-analyses? Evaluating retrieval qualities of Google Scholar, PubMed, and 26 other resources

Michael Gusenbauer[1] | Neal R. Haddaway[2,3]

"We reviewed and tested the 28 search systems with 27 criteria determining each search system's (a) coverage and (b) capability to perform systematic searches via queries, filters, and handsearching so that a reviewer can obtain reproducible results, efficiently, and with high recall and precision." (Gusenbauer and Haddaway, 2019).

1. ACM Digital Library	11. Education Resources Information Center	21. Semantic Scholar
2. AMiner	12. Google Scholar	22. SpringerLink
3. arXiv	13. IEEE Xplore Digital Library	23. Transport Research International Documentation
4. Bielefeld Academic Search Engine	14. JSTOR	24. Virtual Health Library *(LILACS)*
5. CiteSeerX	15. Microsoft Academic	25. Web of Science *(Medline, Web of Science Core Collection)*
6. ClinicalTrials.gov	16. OVID *(Embase/Embase Classic, PsycINFO)*	26. Wiley Online Library
7. Cochrane Library *(CENTRAL)*	17. ProQuest *(ABI/Inform Global, Nursing & Allied Health Database, Public Health Database)*	27. WorldCat–Thesis/Dissertations
8. Digital Bibliography & Library Project	18. PubMed *(Medline)*	28. World WideScience
9. Directory of Open Access Journals	19. ScienceDirect	
10. EbscoHost *(CINAHL Plus, EconLit, ERIC, Medline, SportDiscus)*	20. Scopus	

Comparison of databases/platforms

Received: 2 November 2018 | Revised: 7 August 2019 | Accepted: 6 September 2019
DOI: 10.1002/jrsm.1378

RESEARCH ARTICLE

WILEY

Which academic search systems are suitable for systematic reviews or meta-analyses? Evaluating retrieval qualities of Google Scholar, PubMed, and 26 other resources

Michael Gusenbauer[1] | Neal R. Haddaway[2,3]

"Overall, we found that only 14 of the 28 academic search systems examined are well-suited to evidence synthesis in the form of systematic reviews in that they met all necessary performance requirements .." (Gusenbauer and Haddaway, 2019).

1. ACM Digital Library,
2. Bielefeld Academic Search Engine (BASE)
3. ClinicalTrials.gov
4. Cochrane Library
5. EbscoHost
6. OVID
7. ProQuest
8. PubMed (Free)
9. ScienceDirect,
10. Scopus
11. TRID
12. Virtual Health Library
13. Wiley Online Library
14. Web of Science


Developing the search strategy

Developing the search strategy

- The important aspects of developing the search strategy are:
  1. The use of synonyms and abbreviations of the concept
  2. The use of Boolean operators to link the concepts (AND, OR)
  3. The use of qualifiers to limit the search

For example, suppose you want to do a systematic review on burnout among nurses during COVID-19; how would you proceed?

Concept 1 Burnout		Concept 2 Nurse		Concept 3 COVID-19
OR Stress	AND	OR Carer	AND	OR Corona
OR Depression		OR Care giver		OR SARS-CoV-2
OR Frustration		OR Attendant		OR Corona virus
OR Nervous breakdown		OR Nursing practitioner		OR Coronavirus
OR Emotional exhaustion		OR Medical Assistant		…

Search String

- These synonyms are then used to write the basic version of the search string
  - (“Burnout” OR “Depression” OR “Stress” OR “Frustration” OR “Nervous breakdown” OR “Emotional exhaustion”) AND (“Nurse” OR “Attendant” OR “Nursing practitioner” OR “Medical Assistant” OR “Carer” OR “Care giver”) AND (“COVID-19” OR “Corona virus” OR “Coronavirus” OR “Corona” OR “SARS-CoV-2”)
- This search string would yield a large number of references. This number is cut down by qualifiers and filters (different databases use different kinds of syntax). Examples include:
  - Wild cards (eg nurs* will include nurses, nursing)
  - Searching only from the title (ti), title, and abstract (tiab)
- In PubMed, MESH terms can be used to get specific search terms, which can help in refining the search

Search Strategy to Identify Research Problems

(Title Search to Identify viable Research Problem)

"Legal aspects of Economic Condition of Women at Workplace"

6,313

"Women in Workplace"

6870

(WOM?N) AND (WORK OR WORKPLACE OR OFFICE OR FACTORY) NOT (HOME)

271

TS=(WOM?N) and (TS=OFFICE) **Refined by: TOPIC:** (Economic)

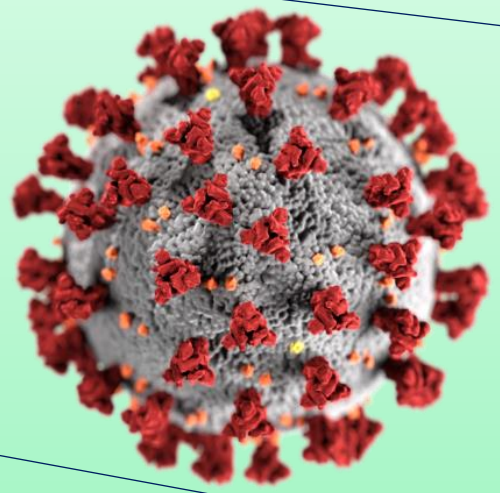
17

TS=(WOM?N) and (TS=OFFICE) **Refined by: TOPIC:** (Economic) AND **TOPIC:** (LAW)

Reviewing 17 Article is Much Easier

Search Strategy to Identify Research Problems

(Topical Search to Identify Research Problem)



13,431

“Coronavirus”

Italy

China

412

Vaccines

45

Economy

2

Italy

20

China

2979

Vaccines

543

TS=(Coronavirus)

TS=(Coronavirus) AND CU=(China)

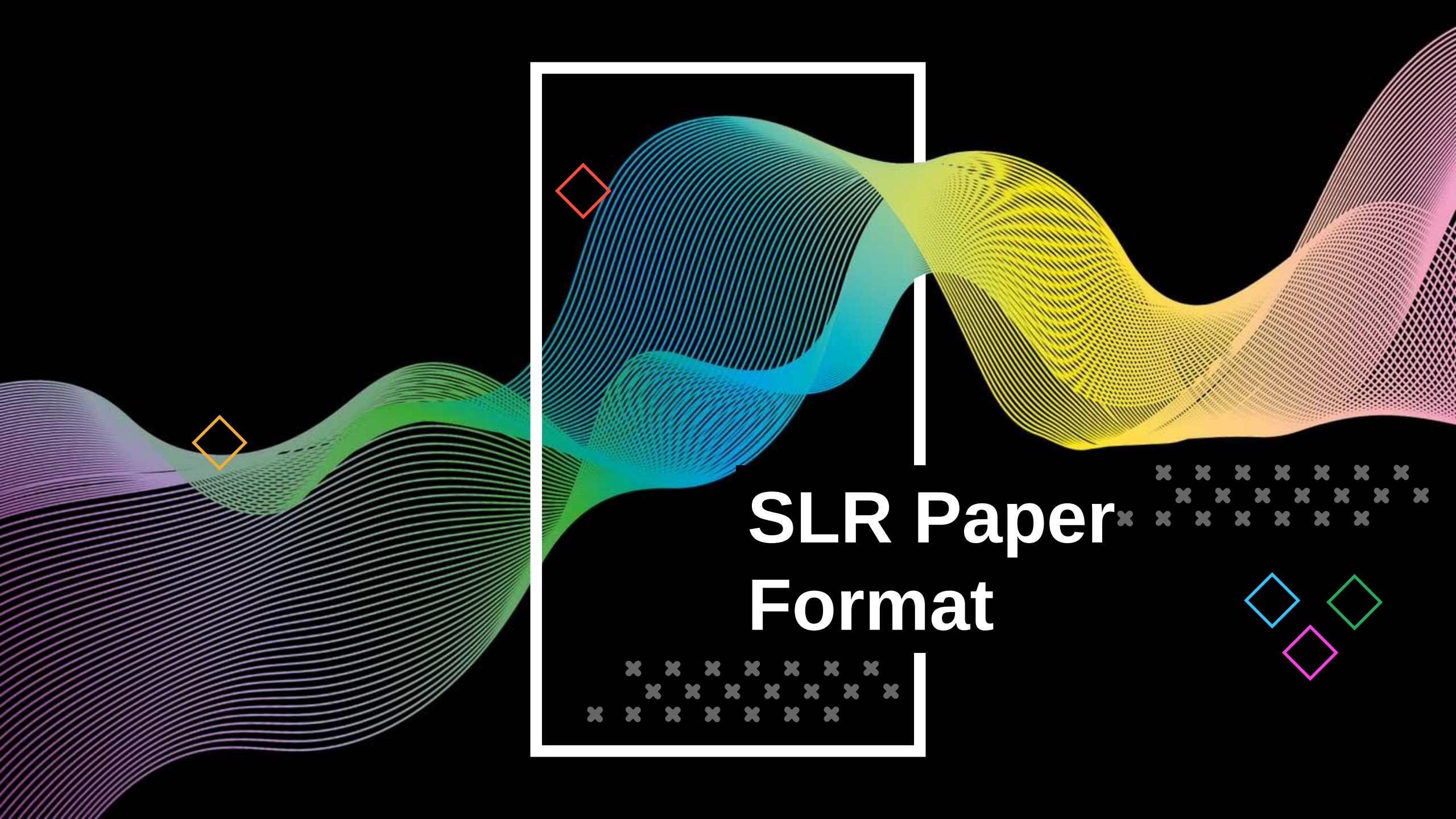
TS=(Coronavirus) AND CU=(Italy)

TS=(Coronavirus) AND CU=(Italy AND China)

TS=(Coronavirus) AND CU=(Italy) AND TS=(Economy)

TS=(Coronavirus) AND CU=(China) AND TS=(Vaccines)

TOPIC: (Coronavirus)**Refined by: COUNTRIES/REGIONS:** (ITALY) AND **TOPIC:** (Vaccine)


SLR Paper
Format

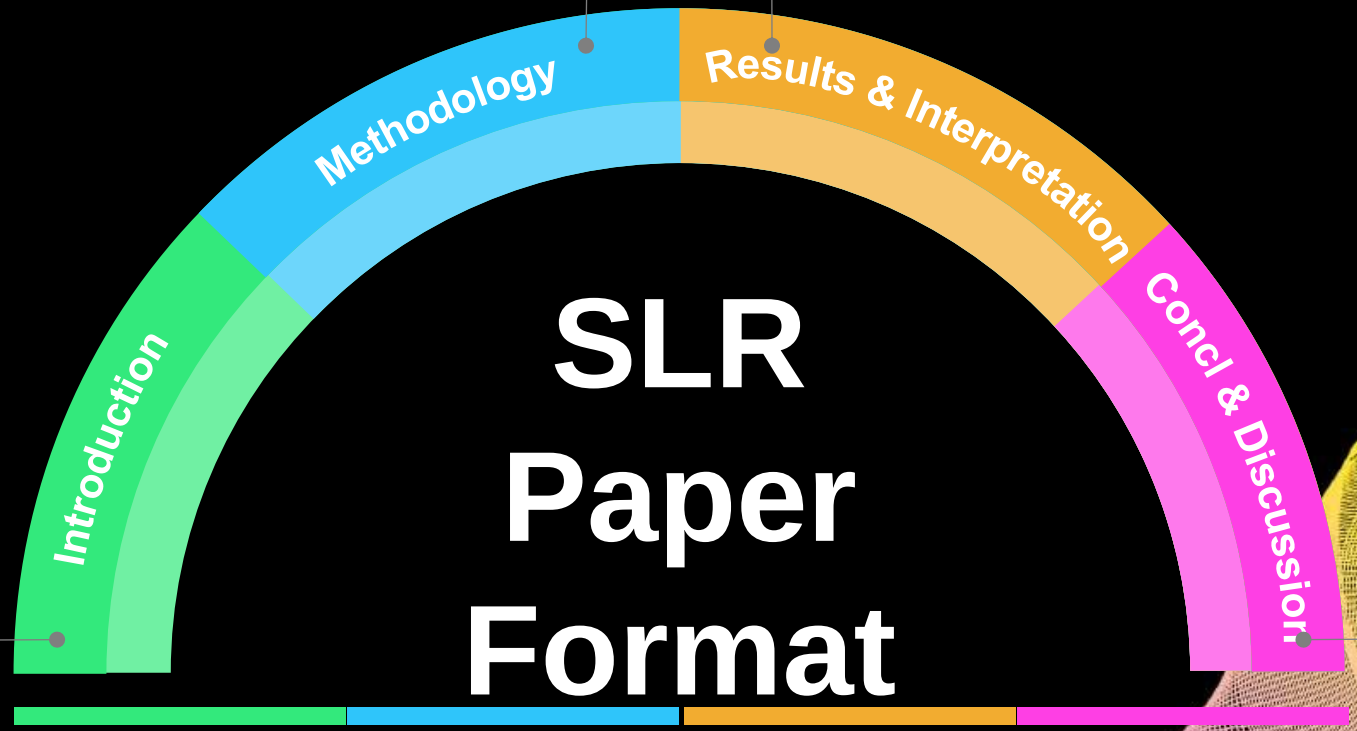
PRISMA Framework

Search Strategy
Selection Criteria
Quality Assessment
Data Exactions

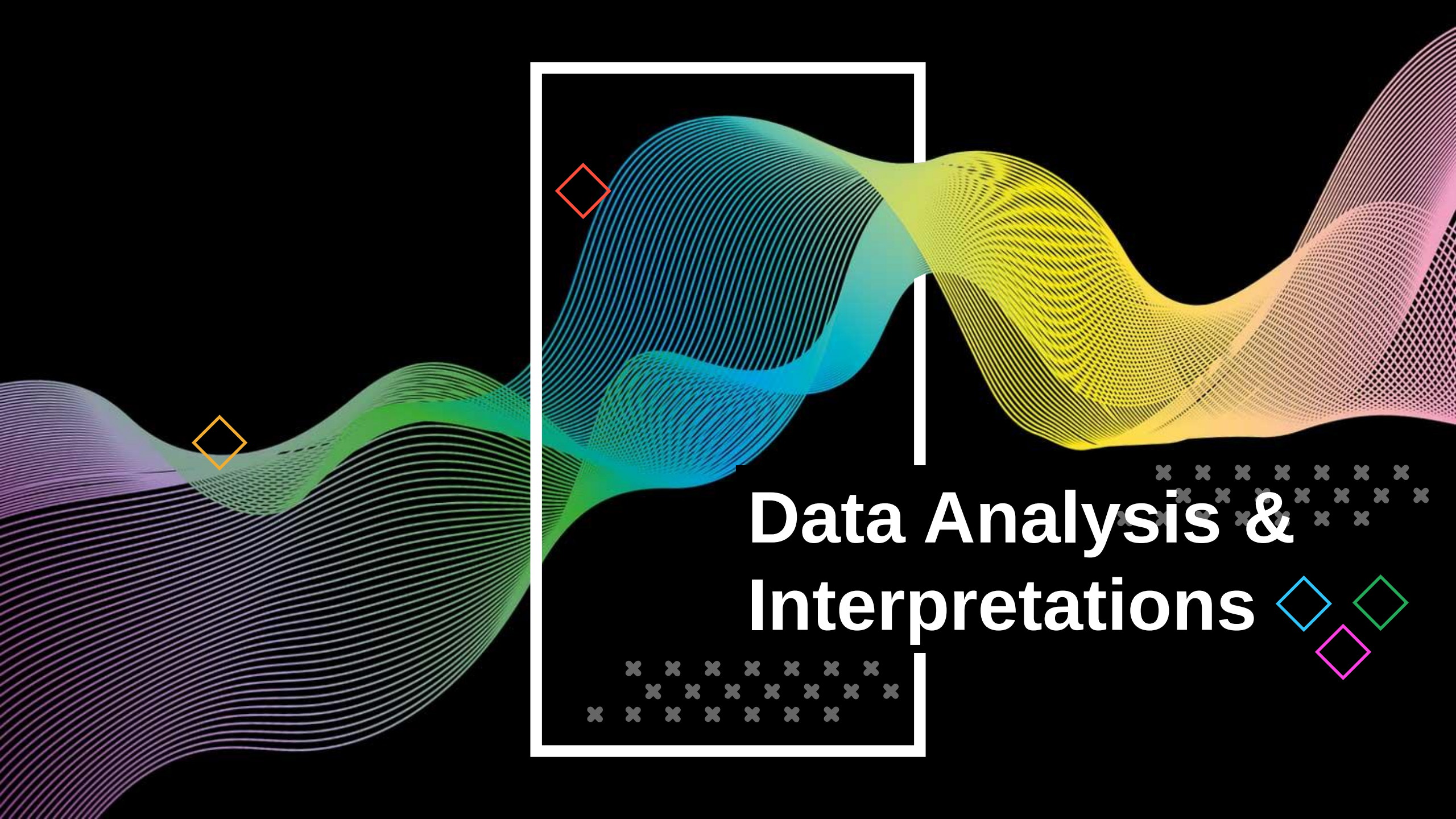
Descriptive Analysis: Year Wise Publications, Country wise Distribution, Most Cited Records, Most Cited Journals

Literature Classification: Methods, Conceptualization, theory and context, thematic distribution

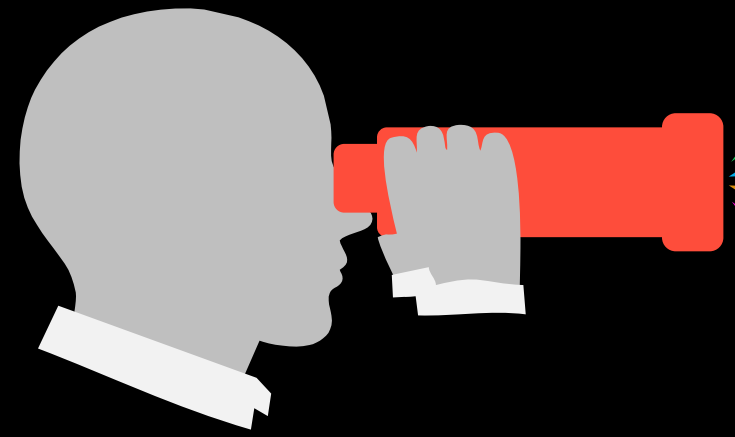
- Existing Knowledge on the Problem
- Limitations on Existing Knowledge
- Research Questions



- Mapping findings with Existing Literature
- Highlights Limitations
- Future Agenda

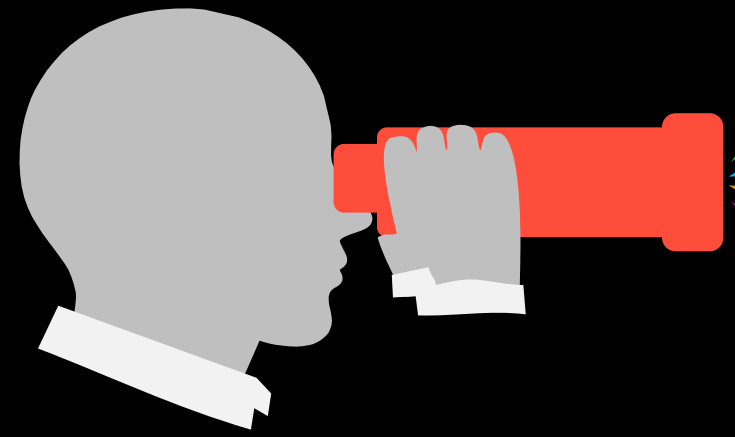

Data Analysis &
Interpretations

Descriptive Analysis



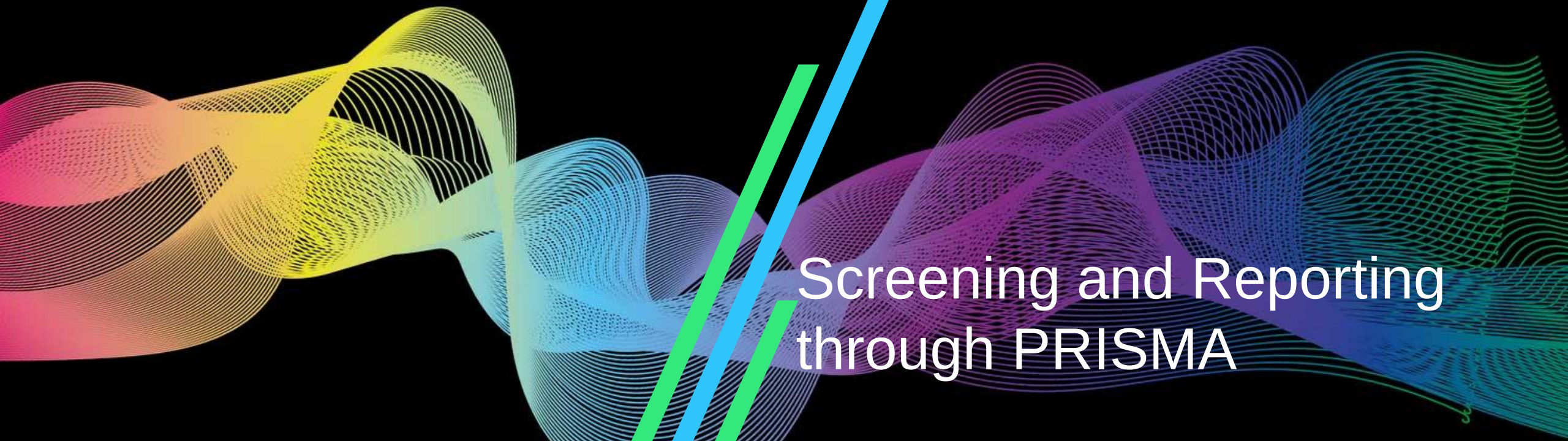
- Year wise Distribution/AGR
- Journals/Country/Authors
- Citations/Databases
- Keywords

Literature Classifications

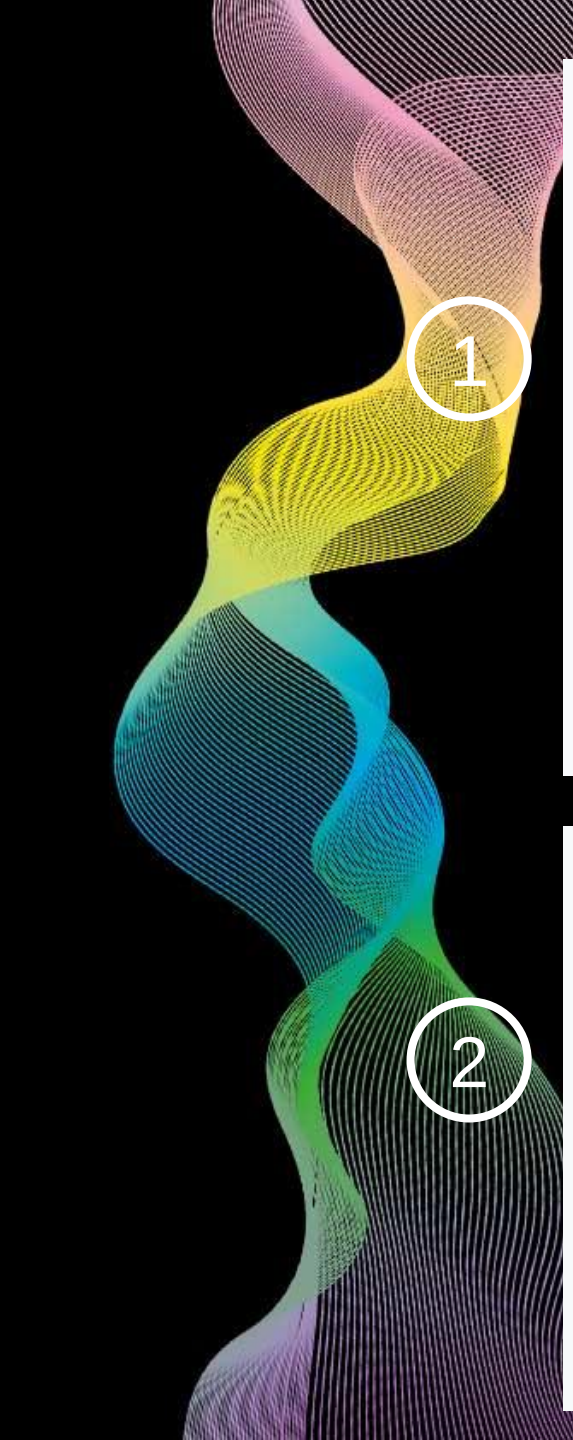


- Methods/Treatment Differentiations
- Relationship Analysis
- Contextual and theory Analysis
- Cluster/Thematic

Steps for carrying out systematic reviews?



Screening and Reporting through PRISMA



Systematic Literature Review Process

- Research question and boundaries
  - Activities
    - Informal literature scanning
    - Identification of a research gap
    - Definition of the research question
    - Inclusion/exclusion criteria
  - Output
    - Topic choice
    - Research question
    - Inclusion/Exclusion criteria

Systematic Literature Review Process

- Search query definition
  - Activities
    - Identification of keywords
    - Validation of keywords
    - Development of search string
  - Output
    - Search string

3

Systematic Literature Review Process

- Database selection
  - Activities
    - Test of the string
    - Choice of database(s)
  - Output
    - Selected database for data extraction

4

5

Systematic Literature Review Process

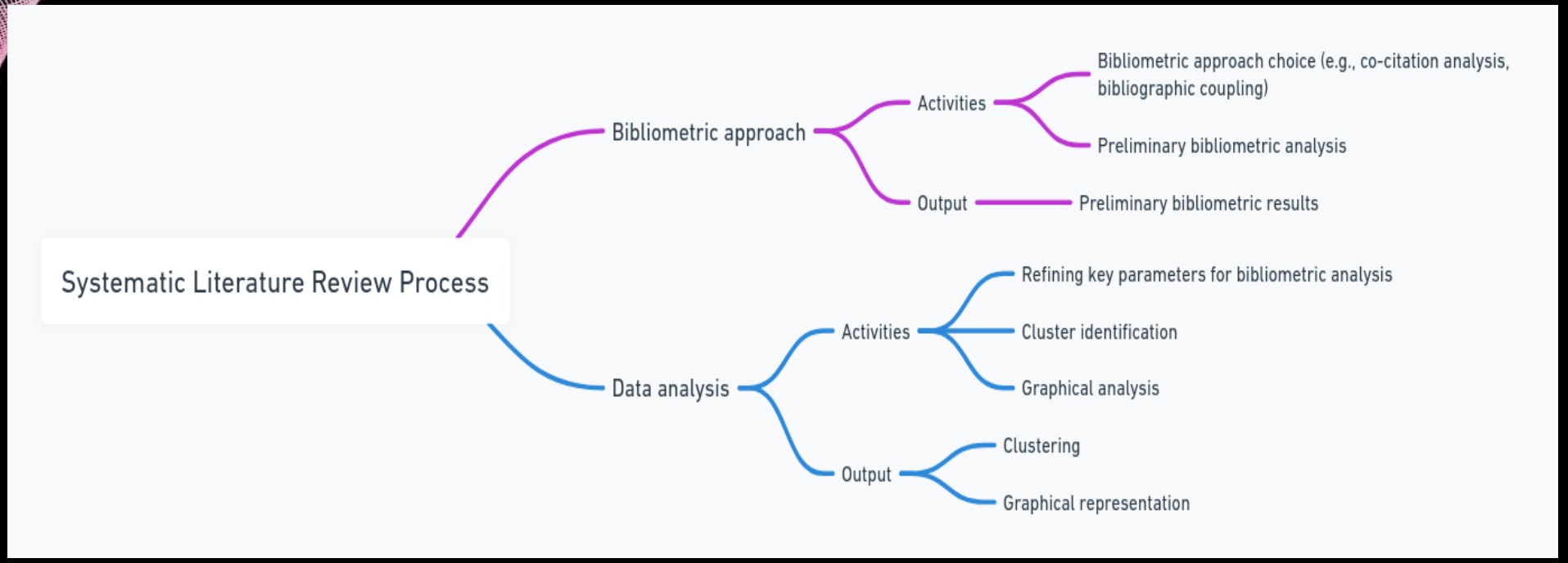
- Data screening and cross-checks
  - Activities
    - Data screening (e.g., duplicates)
    - Setting quality standards
    - Cross-validation of data extraction
  - Output
    - Raw dataset
- Data cleaning and export
  - Activities
    - Creation of document pool
    - Database export
  - Output
    - Refined dataset

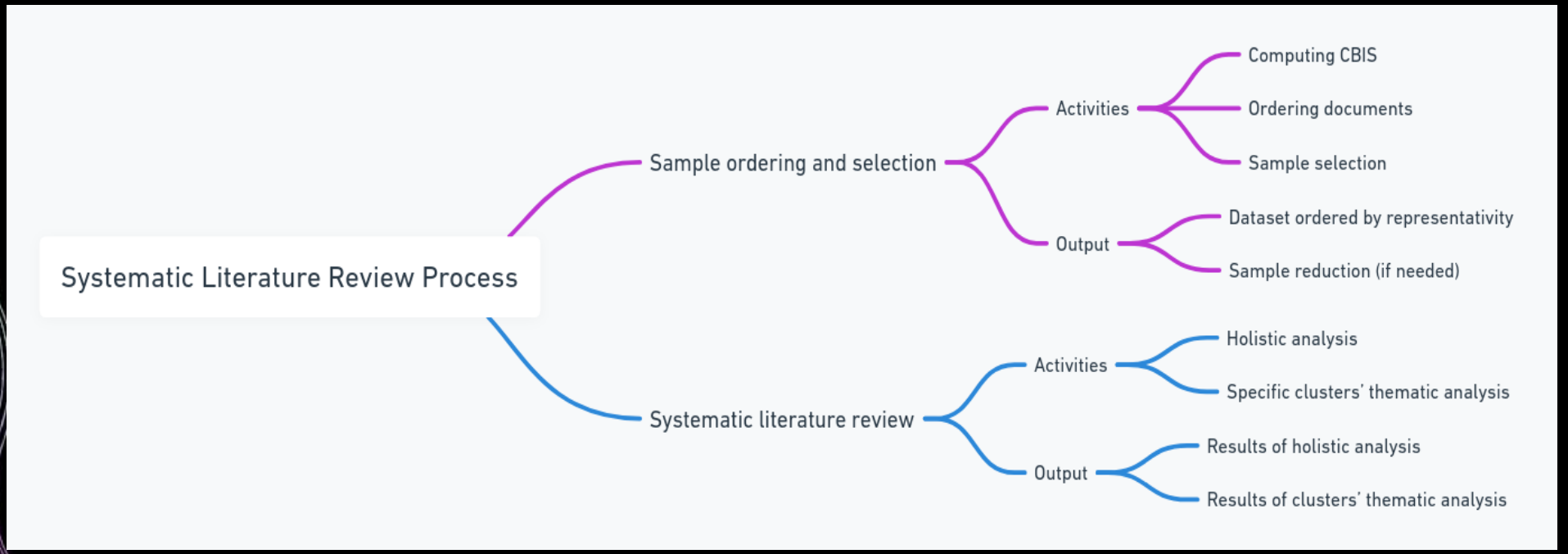
6

7

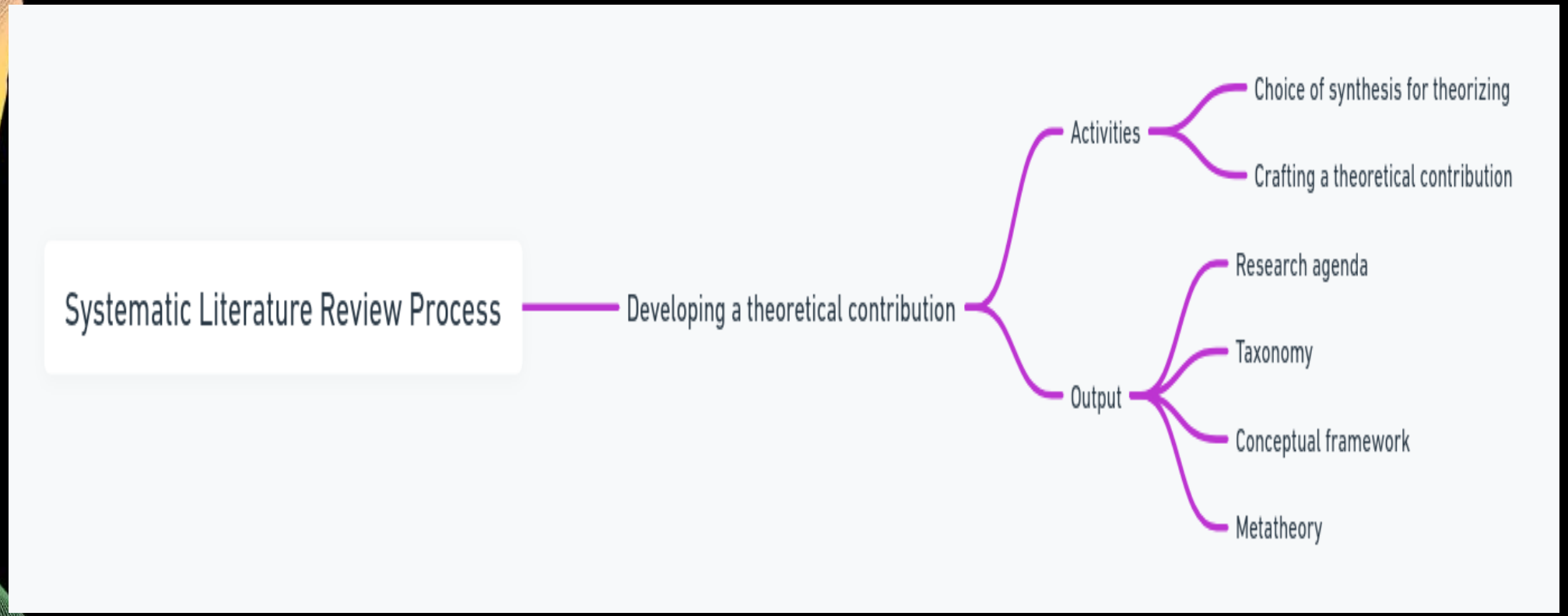
8

9


Systematic Literature Review Process
Bibliometric approach
Activities
Bibliometric approach choice (e.g., co-citation analysis, bibliographic coupling)
Preliminary bibliometric analysis
Output
Preliminary bibliometric results
Data analysis
Activities
Refining key parameters for bibliometric analysis
Cluster identification
Graphical analysis
Output
Clustering
Graphical representation


Systematic Literature Review Process
Sample ordering and selection
Activities
Computing CBIS
Ordering documents
Sample selection
Output
Dataset ordered by representativity
Sample reduction (if needed)
Systematic literature review
Activities
Holistic analysis
Specific clusters' thematic analysis
Output
Results of holistic analysis
Results of clusters' thematic analysis

10


Systematic Literature Review Process
Developing a theoretical contribution
Activities
Choice of synthesis for theorizing
Crafting a theoretical contribution
Output
Research agenda
Taxonomy
Conceptual framework
Metatheory

Methodology Reporting & Identify the Gaps

PRISMA

Identification

Keywords
Search Criteria/Database
Records extracted

Screening

Inclusion
Exclusion

Included

Final number of
articles included for SLR

Keywords

Single word: Online Learning, Distance Learning, Covid19
Combination of Words:" Online Learning"
" Distance Learning"
" Covid19"

Boolean Operator

"Online Learning" OR " Distance Learning " AND "Covid19"

Data Extraction & Analysis

Data Extraction

WOS , Scopus, Google Scholar.

Analysis of Records

Analysis of records through VOSWIever, CiteSpace, Bibiometrix

Descriptive Analysis & Literature Classifications

Descriptive Analysis: Year Wise Publications, Country wise Distribution, Most Cited Records, Most Cited Journals
Literature Classification: Thematic clusters, methods, context

Reporting Results

Methodology :Search strategy, Selection Criteria, Quality Assessment
Descriptive Analysis, Literature Classification

Reporting findings

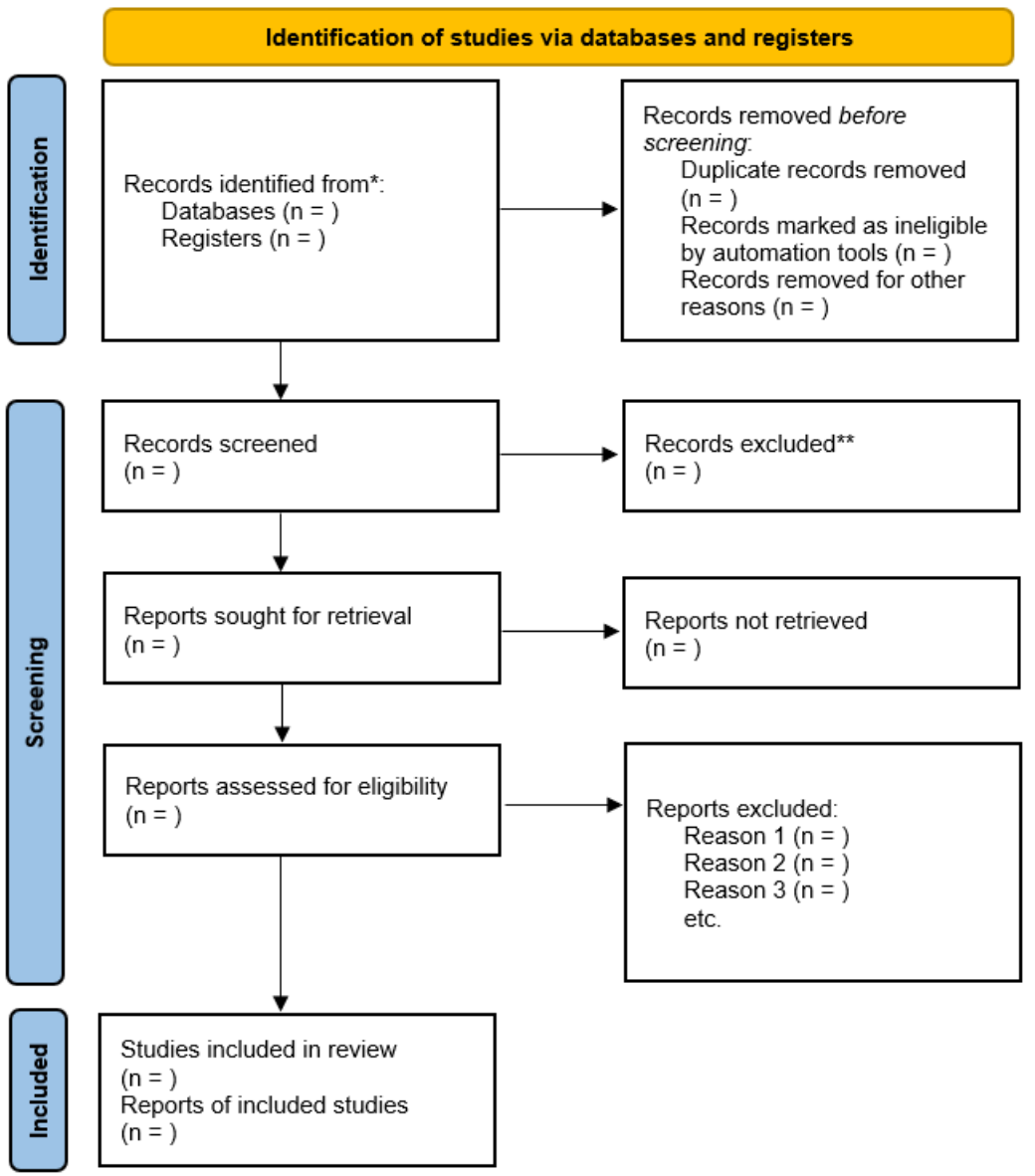
In the 1990s a trend was started on guideline for better reporting of studies.

As part of this trend, a reporting guideline was published in 2009 titled, "**Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA)**" (Moher et al., 2009). It consists of the PRISMA flowchart and the PRISMA statement.

This was "designed to help systematic reviewers transparently report why the review was done, what the authors did, and what they found." (Garrard, 2017).

The flowchart and statement have been revised in 2020.

This guideline has been endorsed by many journals

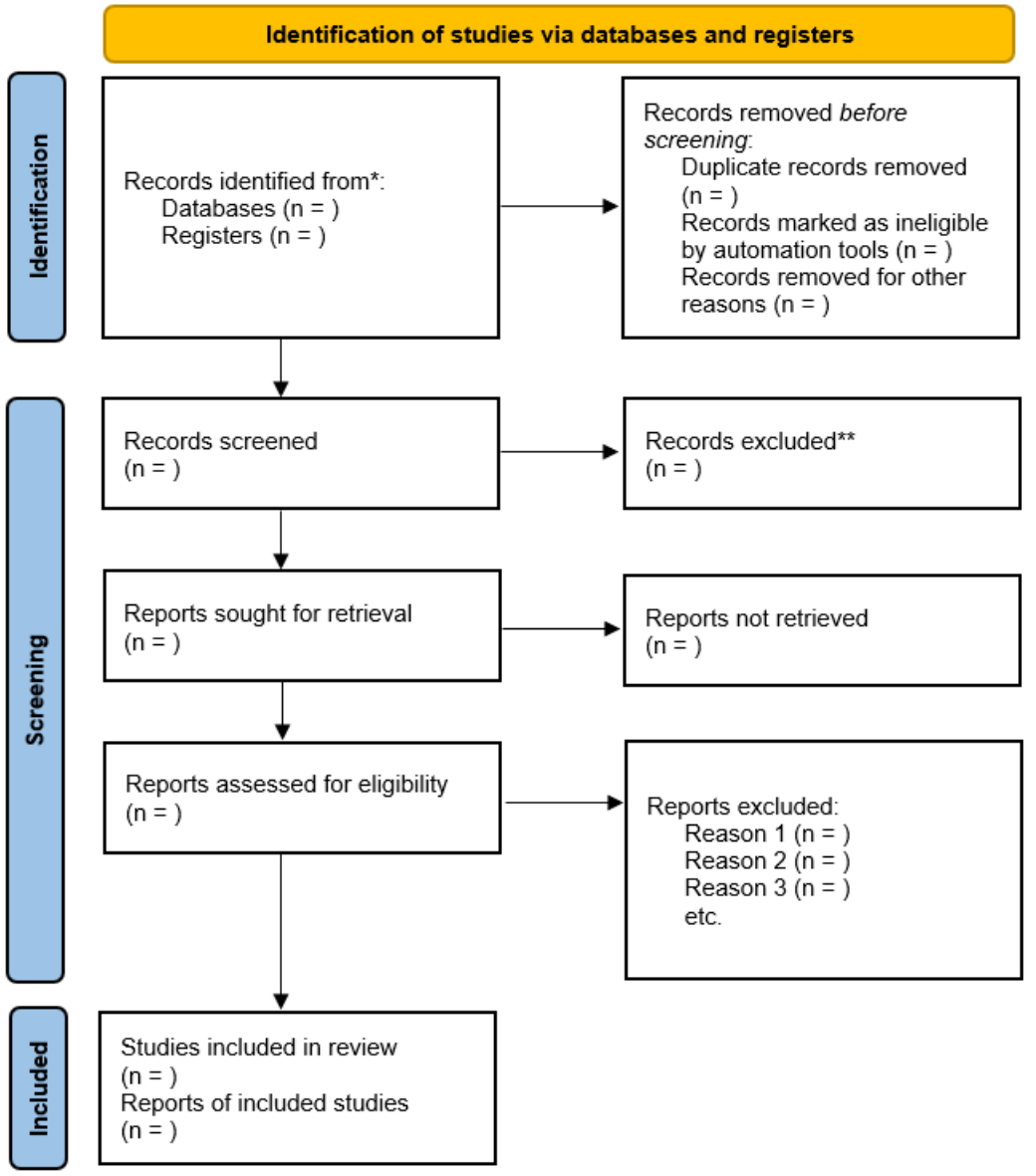


Source: https://prisma-statement.org/prismastatement/flowdiagram.as

What flows from the PRISMA flowchart

What flows from the PRISMA flowchart are as the following:

1. Identify the databases needed
2. Develop a search strategy
3. Use software to search the database and note down the number of records retrieved
4. Remove the duplicate records (deduplicating) and note down the number removed
5. Records the number of ineligible records and reasons
6. Two or more collaborators proceed to the screening stage



Source: https://prisma-statement.org/prismastatement/flowdiagram.as

Example of a completed PRISMA flowchart

A systematic review was carried out in 2014 for reliable (good quality) studies on **Physical Activity Intervention in Adolescents**

1. They used four databases (including PubMed)
2. Initial search got 3507 records
3. After exclusion, 100 were found to be eligible
4. Of these, 77 were excluded
5. 23 were included for quality assessment
6. 16 were excluded for based on quality criteria
7. 7 were finally reviewed (Soares et al., 2014)

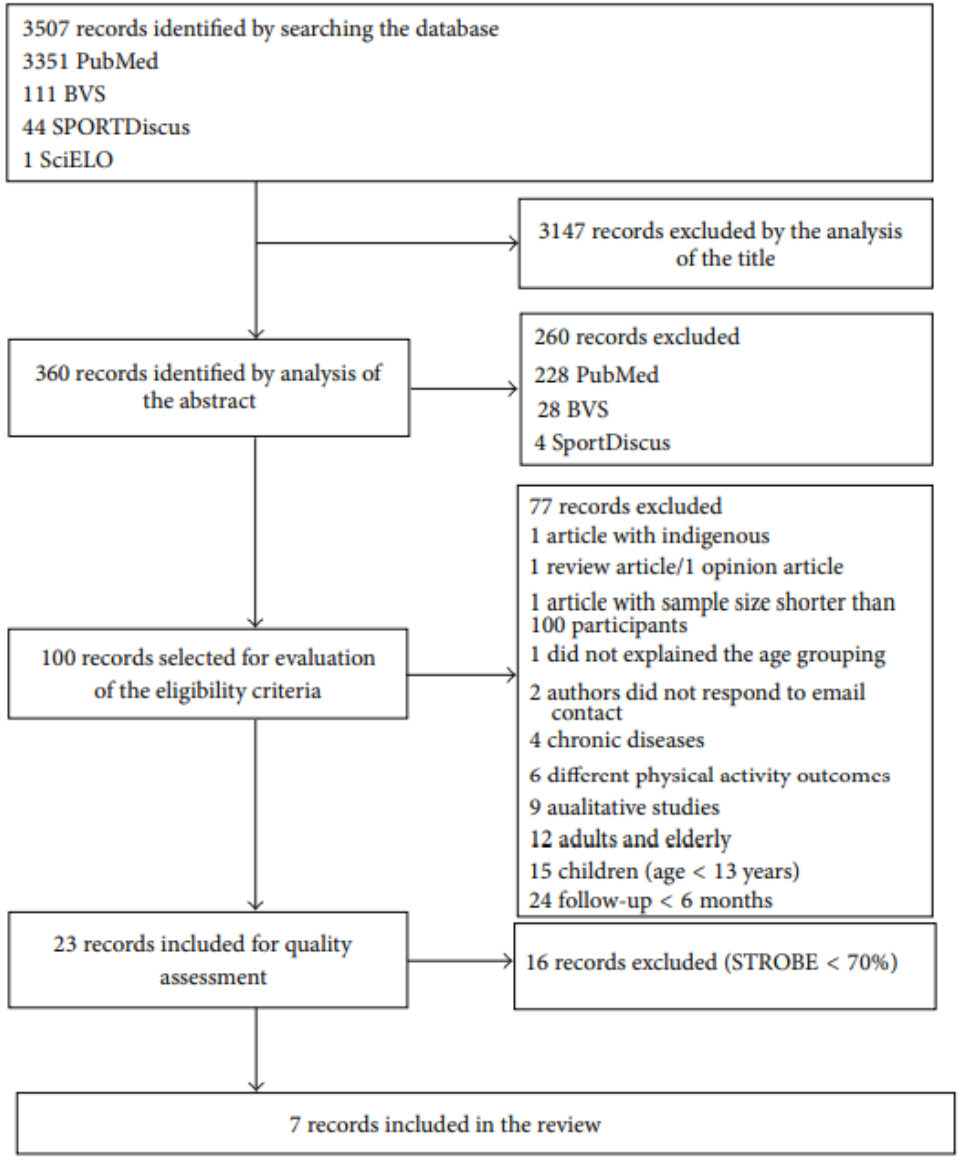
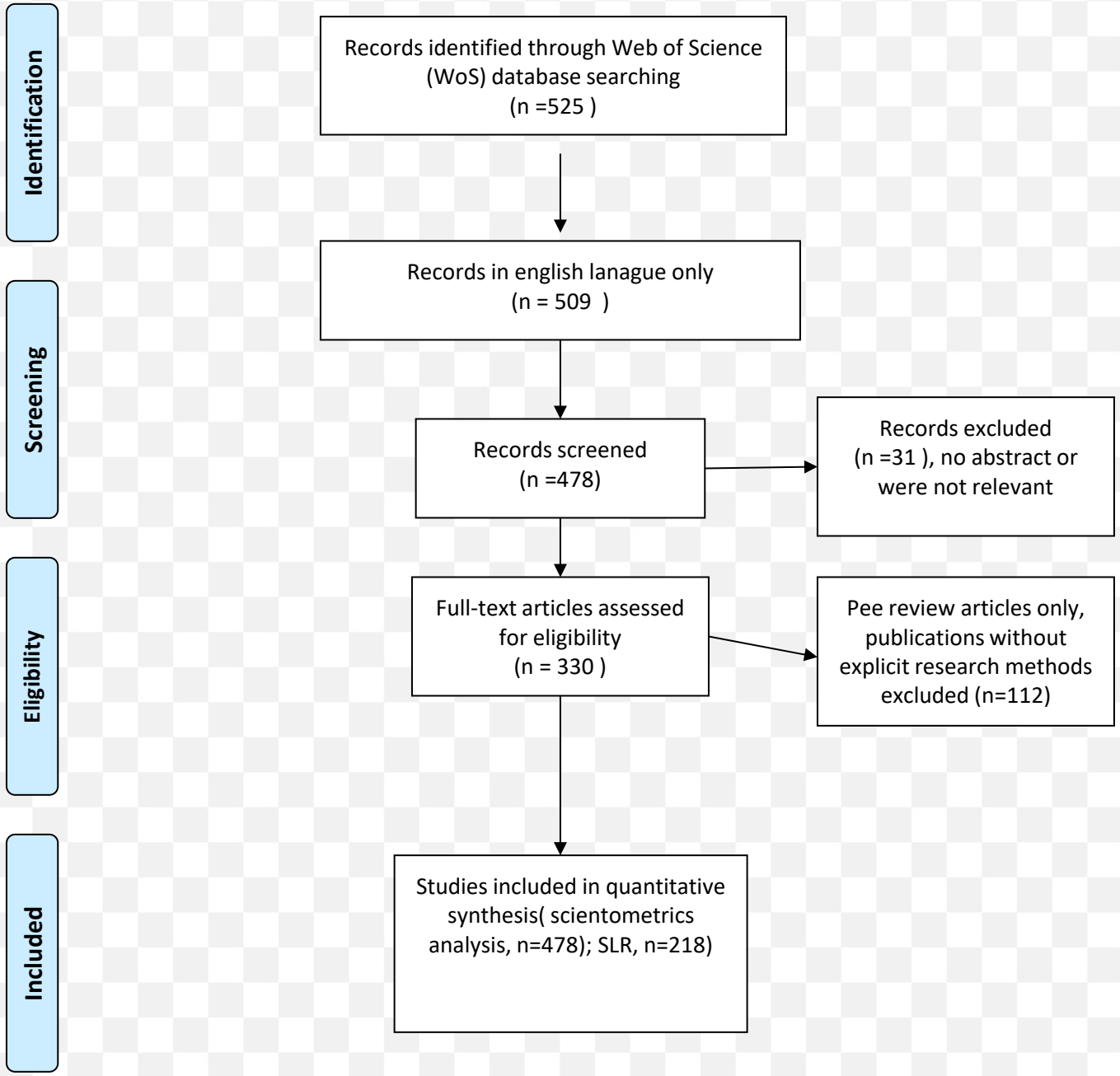


FIGURE 1: Flowchart of the selection of studies through the inclusion criteria.

PRISMA FRAMEWORK

Preferred Reporting Items for Systematic Reviews



Research trends in online distance learning during the COVID-19 pandemic

Sanjaya Mishra, Sidhartha Sahoo & Shriram Pandey

To cite this article: Sanjaya Mishra, Sidhartha Sahoo & Shriram Pandey (2021): Research trends in online distance learning during the COVID-19 pandemic, Distance Education, DOI: 10.1080/01587919.2021.1986373

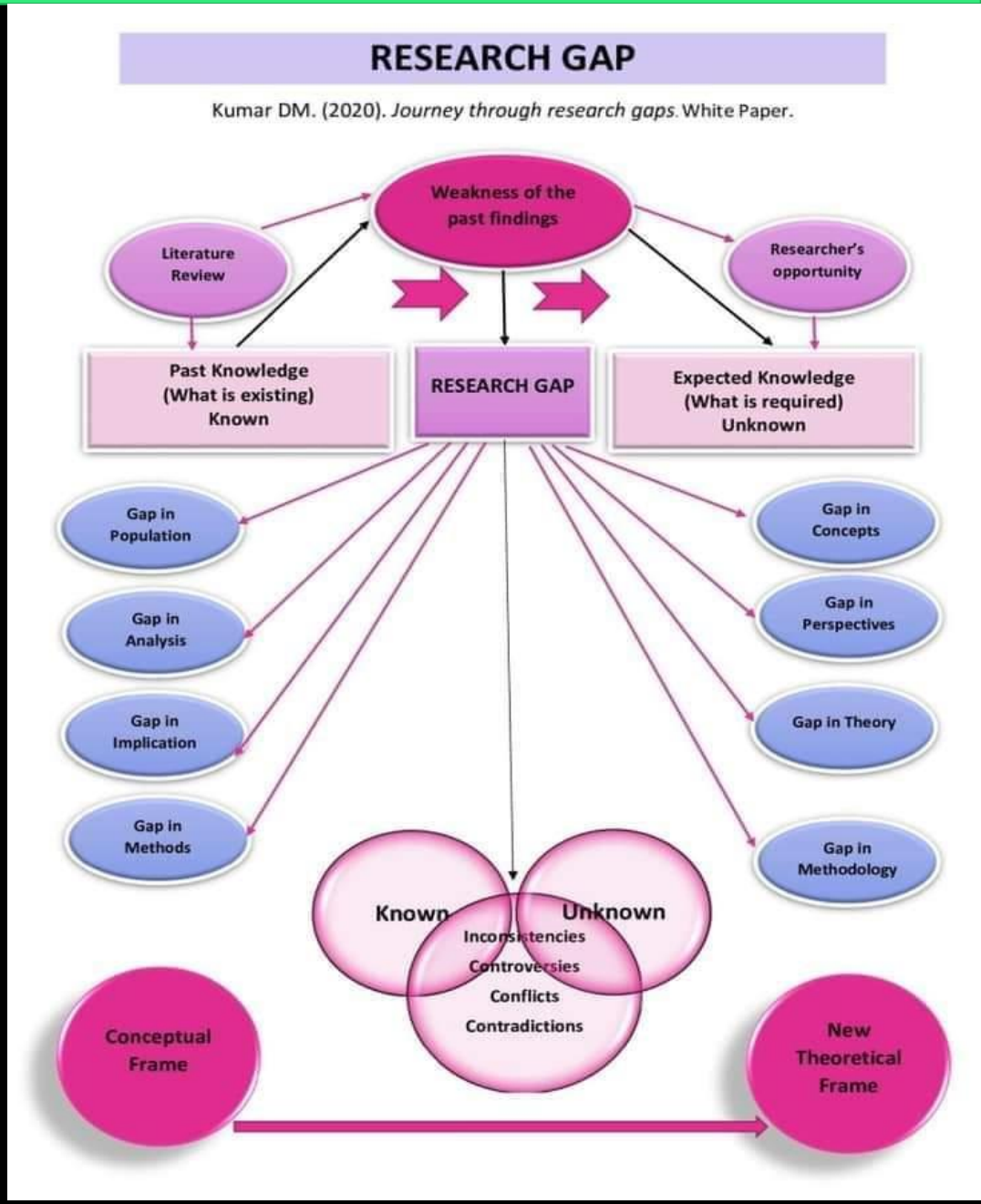
To link to this article: https://doi.org/10.1080/01587919.2021.1986373

Literature Classification

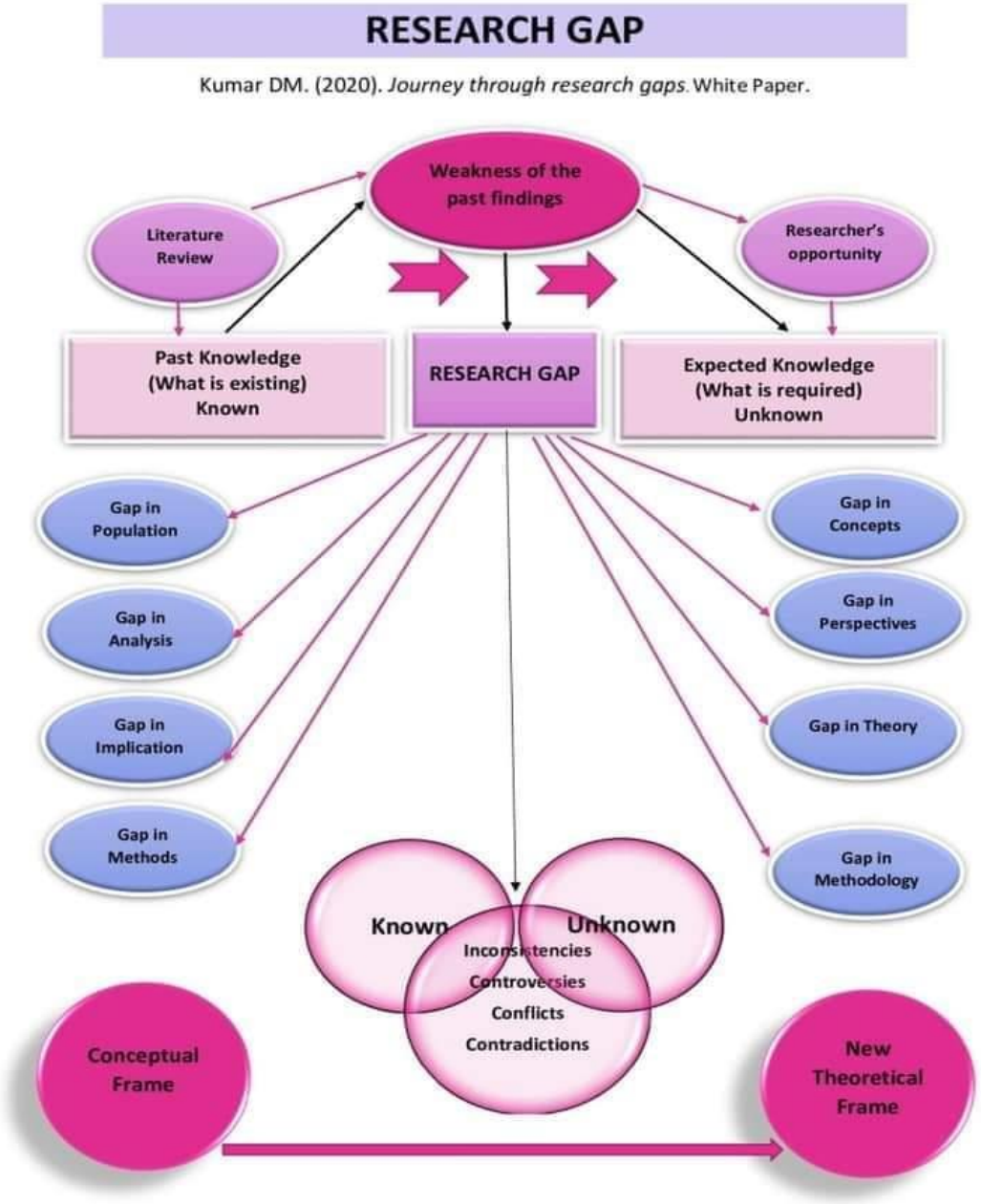
Literature Classification

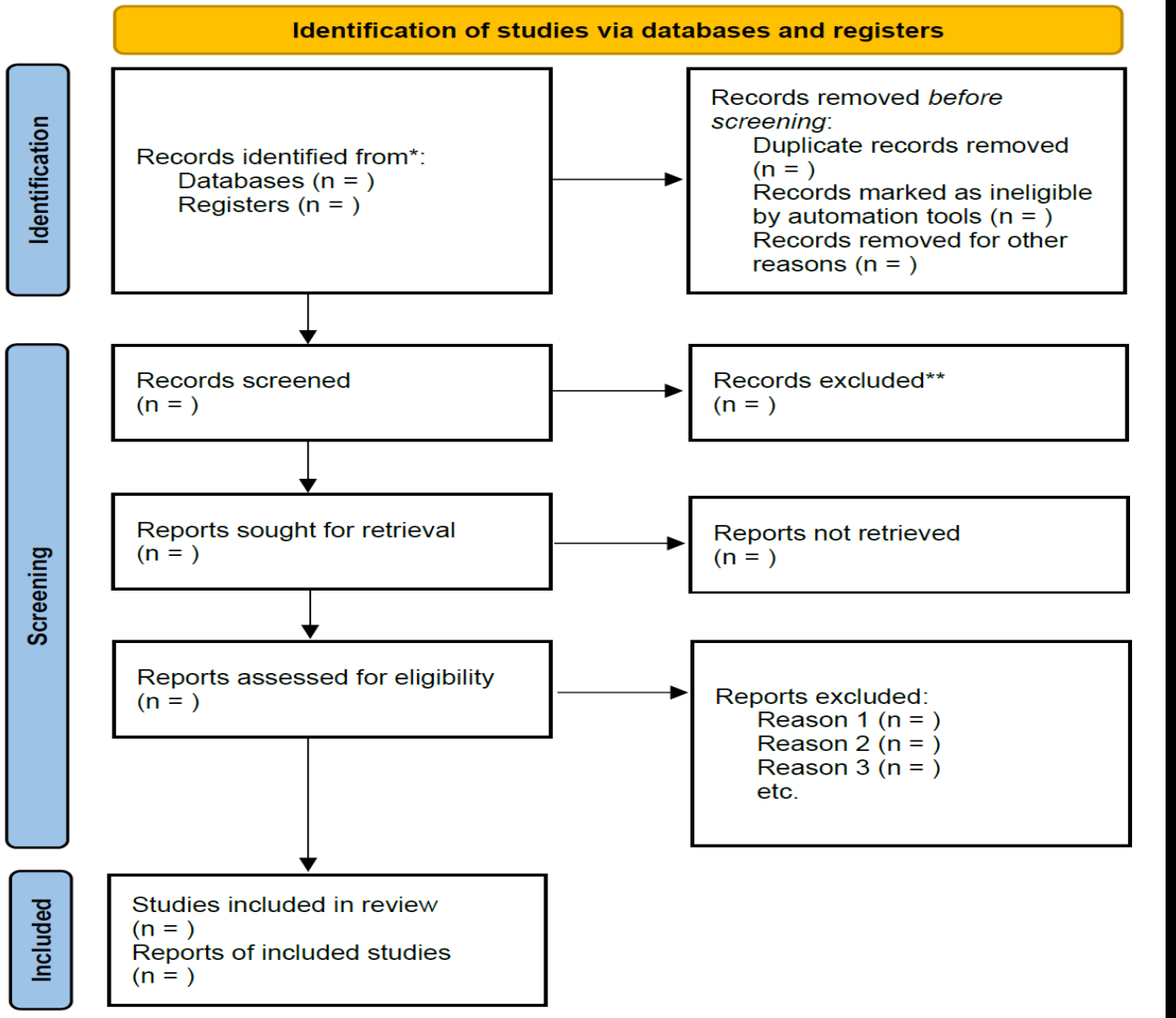
Synthesize Review (Jotting Down Key Aspects) for Finding GAP

Title	
Author(s)	
Journal Details	
Introduction	
Theory	
Methods	
Analysis	
Findings	
Potential Gap	



Synthesize Review in to the Writing- Using PRISMA





Relevant Included

Irrelevant Excluded

Literature Classification

Summary table of evidence

Author, Year	Title of Article	Themes of Study	Focus of Study	Insights of Study
(Xiao et al., 2011)	Integrating climate change adaptation and mitigation into sustainable development planning for Lijiang City	- Climate change impacts on cities - Climate-resilient city planning - CO2 emissions reduction strategies - Vulnerable economic sectors: tourism, agriculture, water supply - Renewable energy for CO2 reduction - Adaptive land use practices in climate planning - Integration of climate change mitigation and adaptation into sustainable city planning	- Integrating climate change adaptation and mitigation into sustainable city planning - Identifying vulnerable economic sectors and proposing mitigation and adaptation strategies - Addressing CO2 emissions and renewable energy potential - Considering land use practices, sectoral approach, and public participation in climate planning	- Integrating climate change adaptation and mitigation into sustainable city planning. - Lijiang City experienced climate change and increased CO2 emissions. - Vulnerable sectors include tourism, agriculture, and water supply. - Proposed strategies for mitigation and adaptation in the tourism city. - Renewable energy has the potential for CO2 reduction. - Land use practices and public participation are considered adaptive in climate planning. The study provides an understanding of implementing integrated climate planning.

Organizing the Literature

Reliable and valid reviews involve using a standardized form for abstracting data from articles, training reviewers (if more than one) to do the abstraction, monitoring the quality of the review, and pilot testing the process.

One way to avoid missing out on important studies is to review the references in high-quality articles.

Pearl Mining, Deep Search, and Cross Reference can also performed

Template

Source	Study Population	Problem Scope/ Size	Context: Social, Political, Eco-nomic, Health	Audiences Affected	Influential	Current Knowledge, Attitude, Beliefs, Behaviors	Factors influencing behavior: Individual/Family/ Community/Society/ Health System	Communication Channels

Discussion and Conclusion

The SLR process concludes by synthesizing the results. The synthesis has four main purposes:

Describe current knowledge about a topic or body of research

Support the need for and significance of new research

Explain research findings

Describe the quality of a body of research

4 Important Things to remember

Clear Research Questions

Understanding of search mechanism: Search Strings

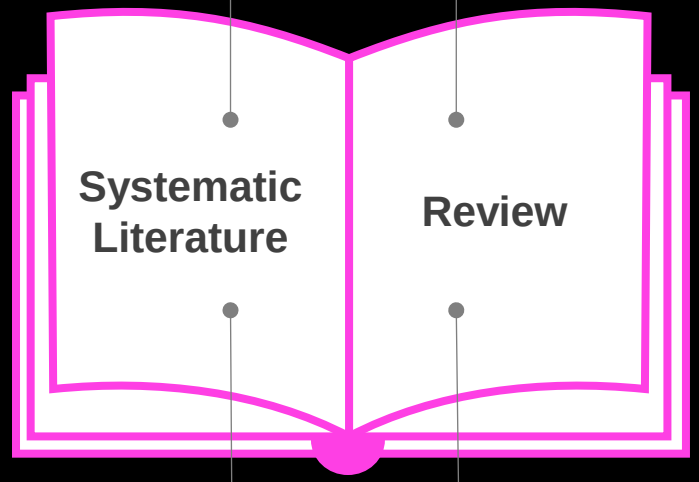
Understanding of the key terms

Don’t include multiple concepts in one SLR

Key Steps

Propose a Topic of Your Research

Plan your topic based on Current Problems Develop Research Question



Choose a Suitable Database

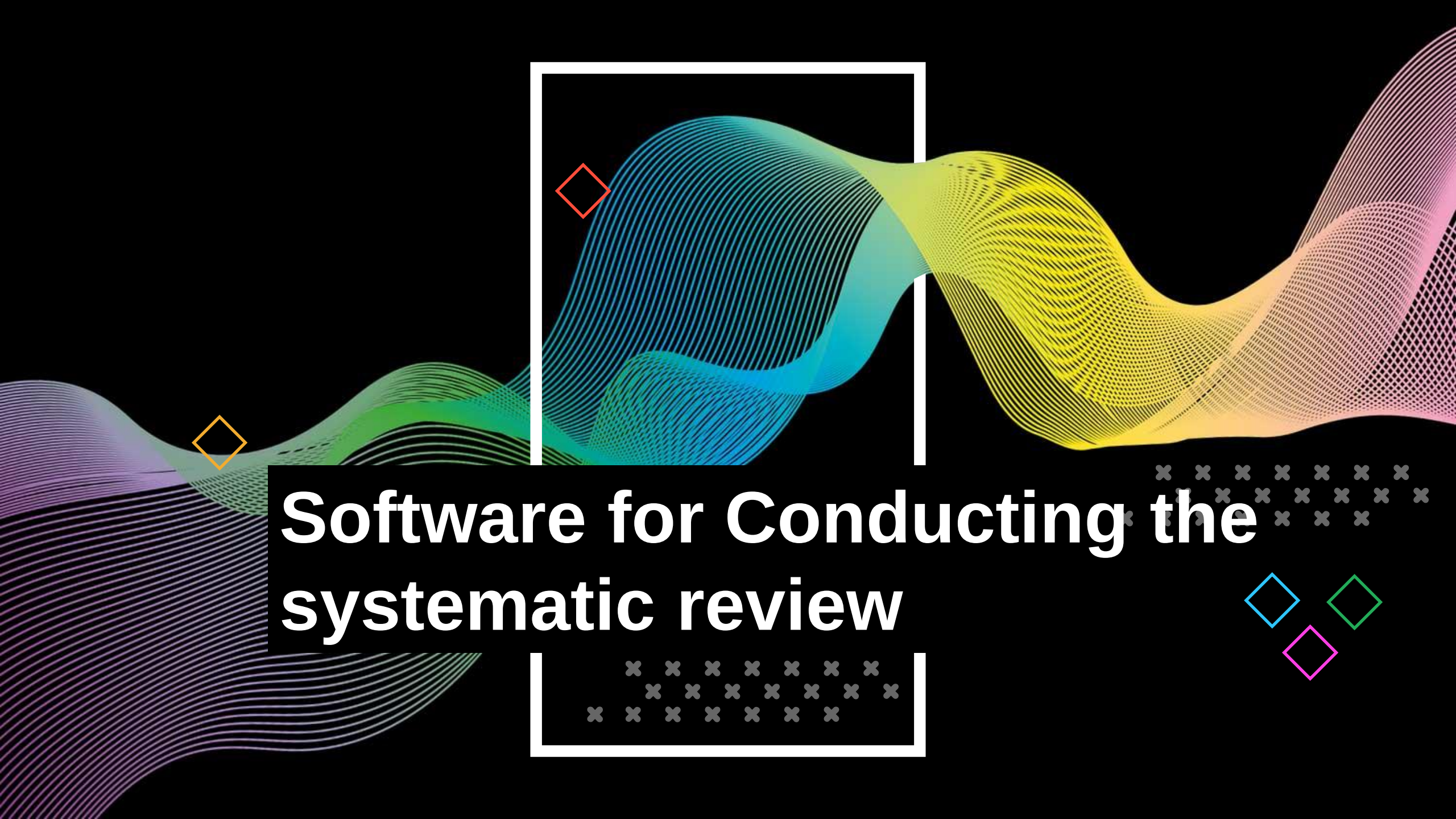
Select a database specific to the subject area, develop a search strategy, take expert advise

Search & Retrieve Literature

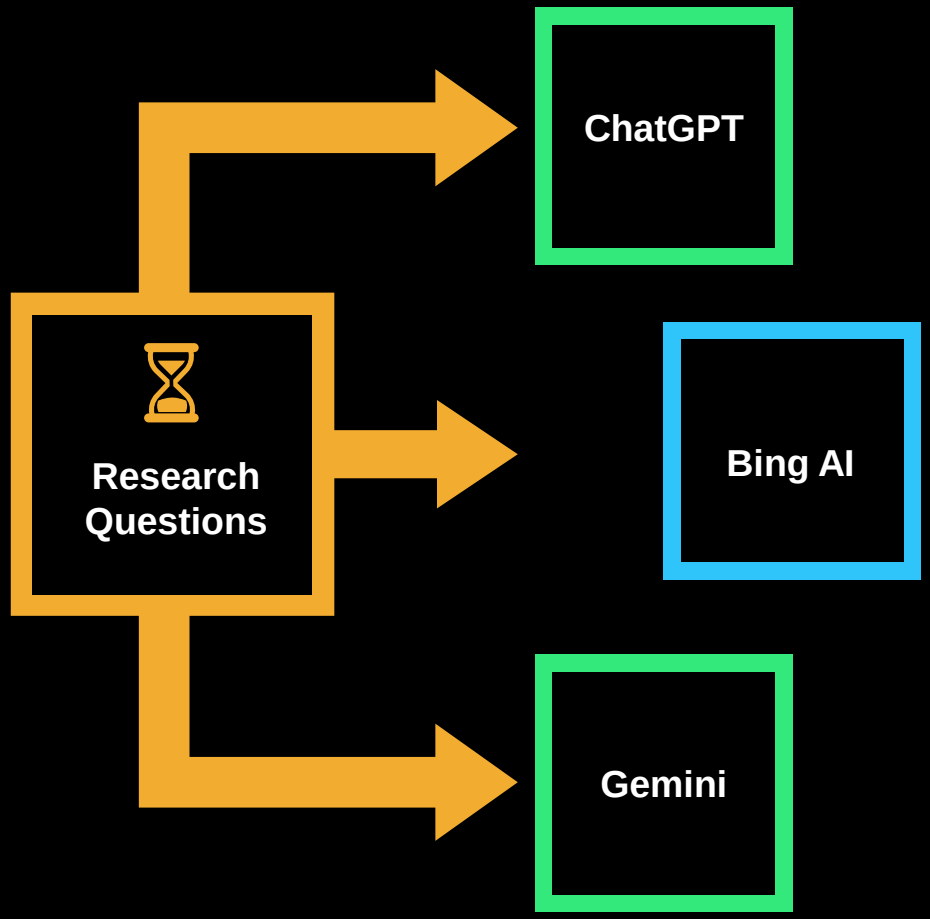
Retrieve data from various databases, organize it into the template, analyze it

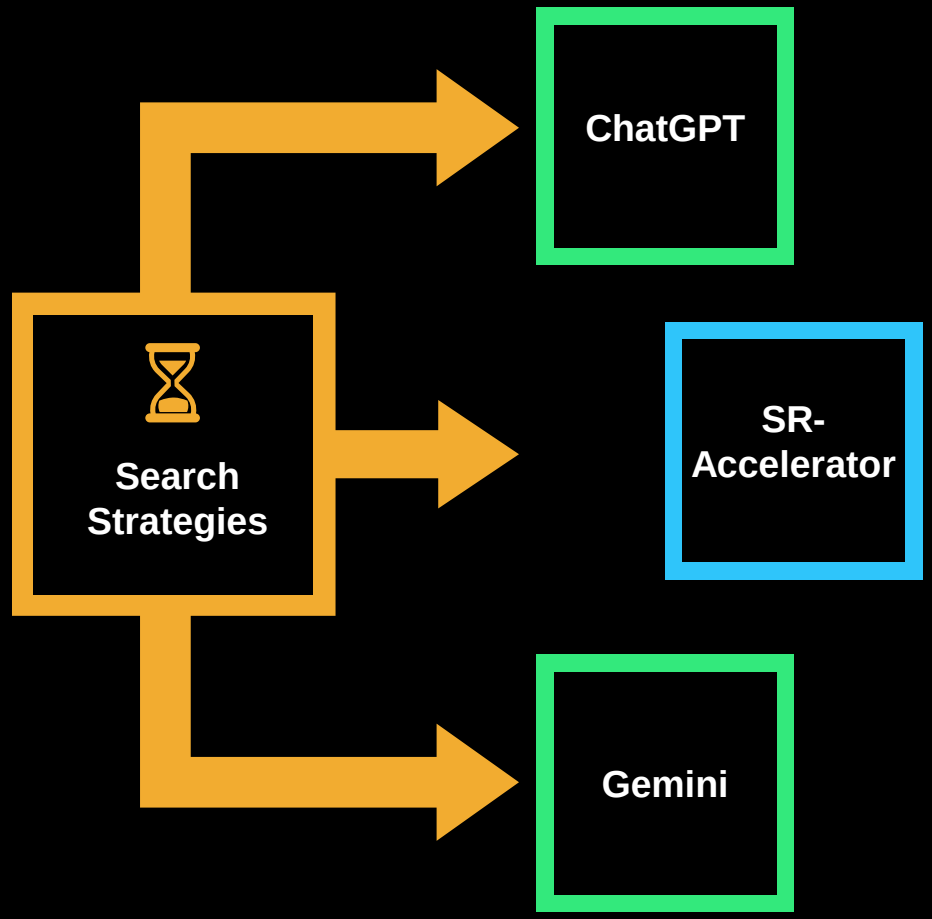
Synthesize and Present

Write your Systematic review and articulate in terms of current knowledge, methodology, software tools, results etc. and present it in a standard format

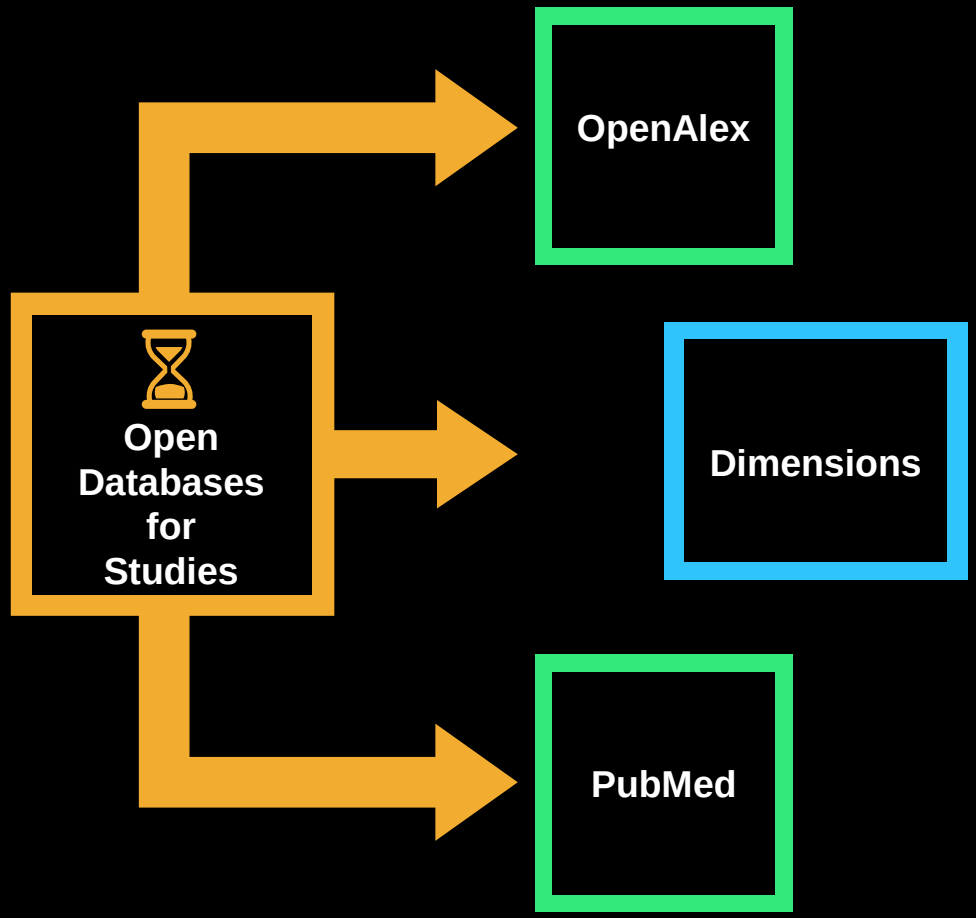

Software for Conducting the systematic review

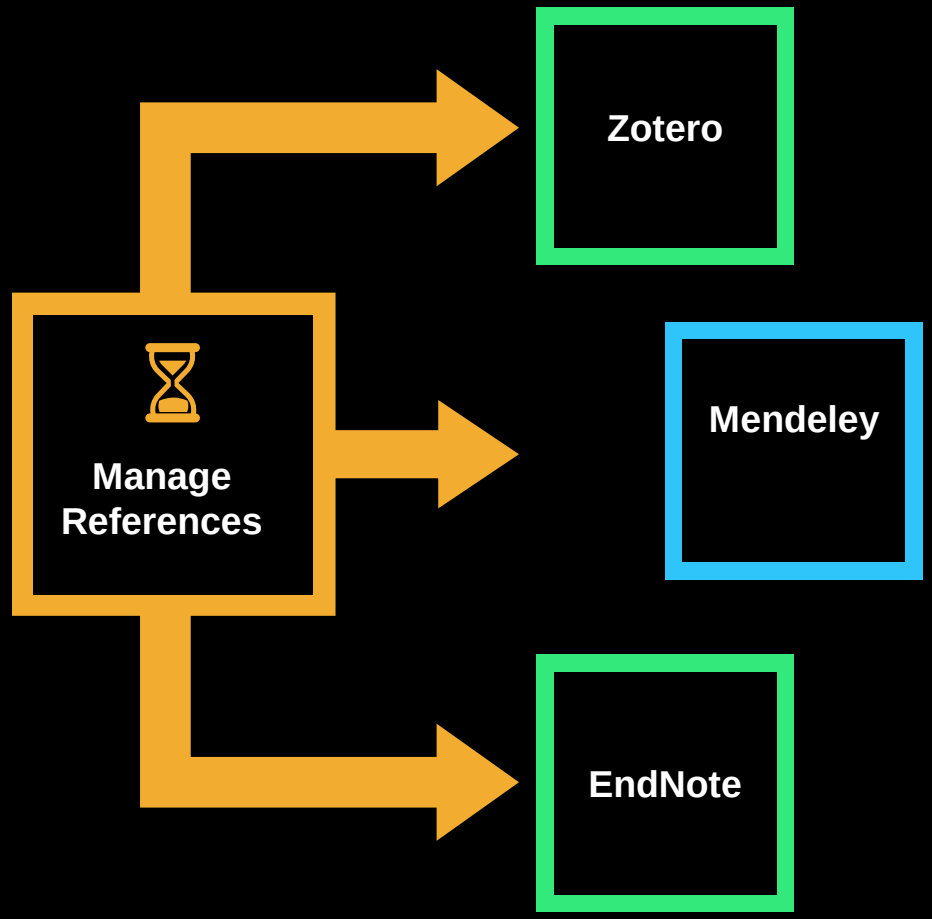
Important Tools for Systematic Review



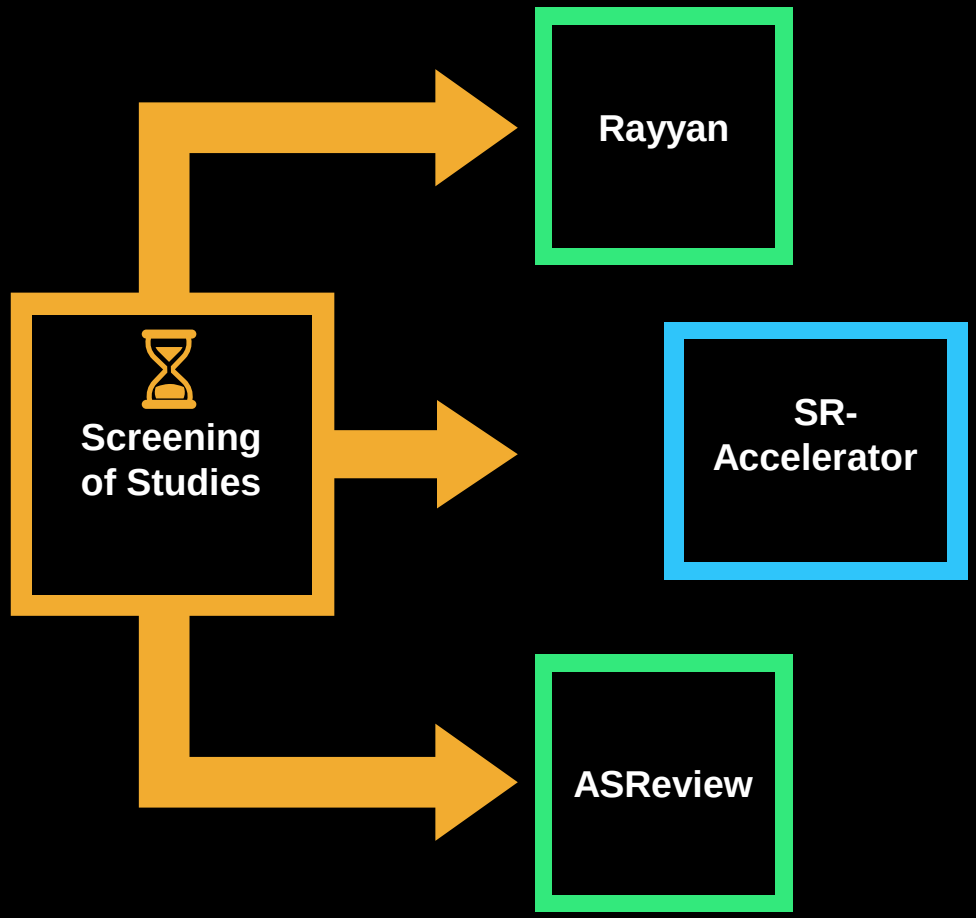


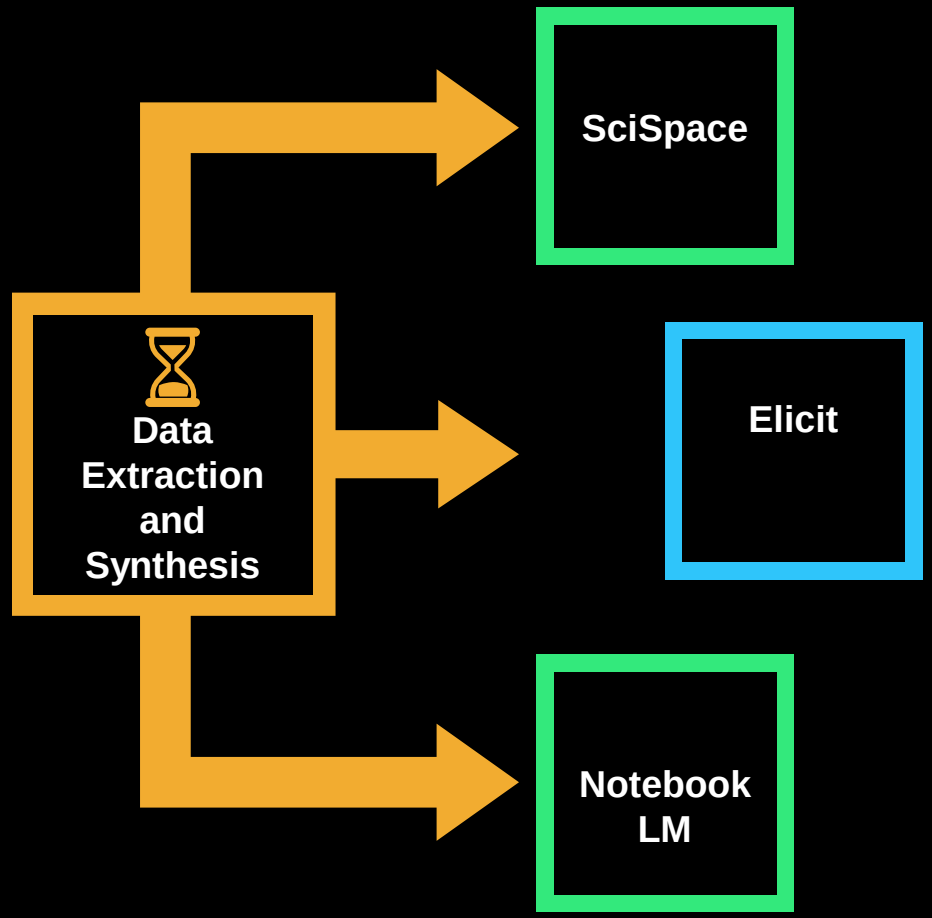
Important Tools for Systematic Review





Important Tools for Systematic Review

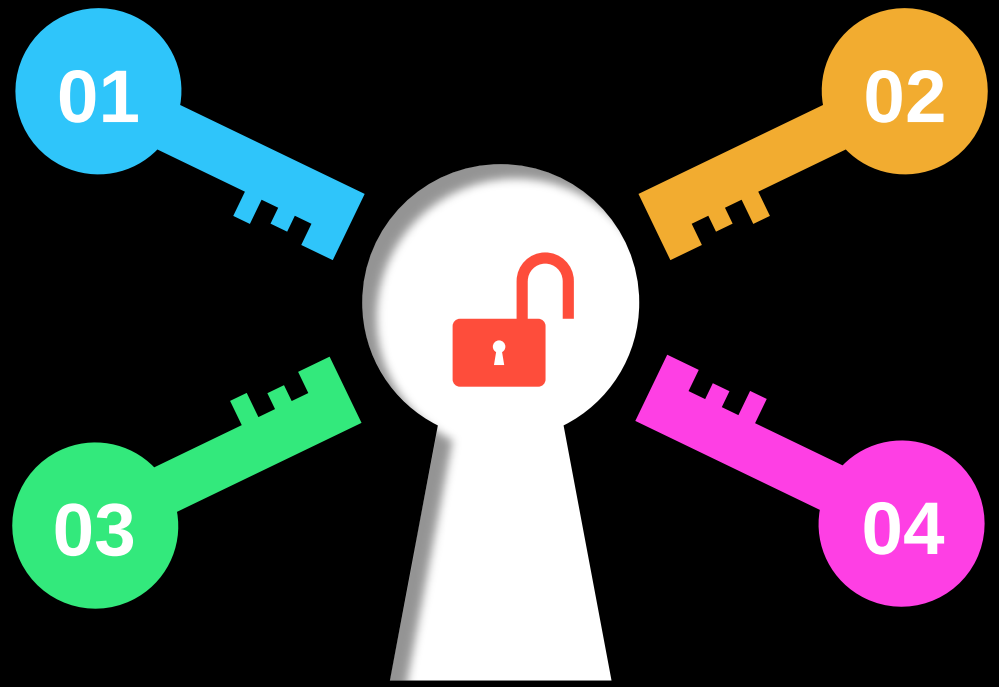




Advance SLR-M

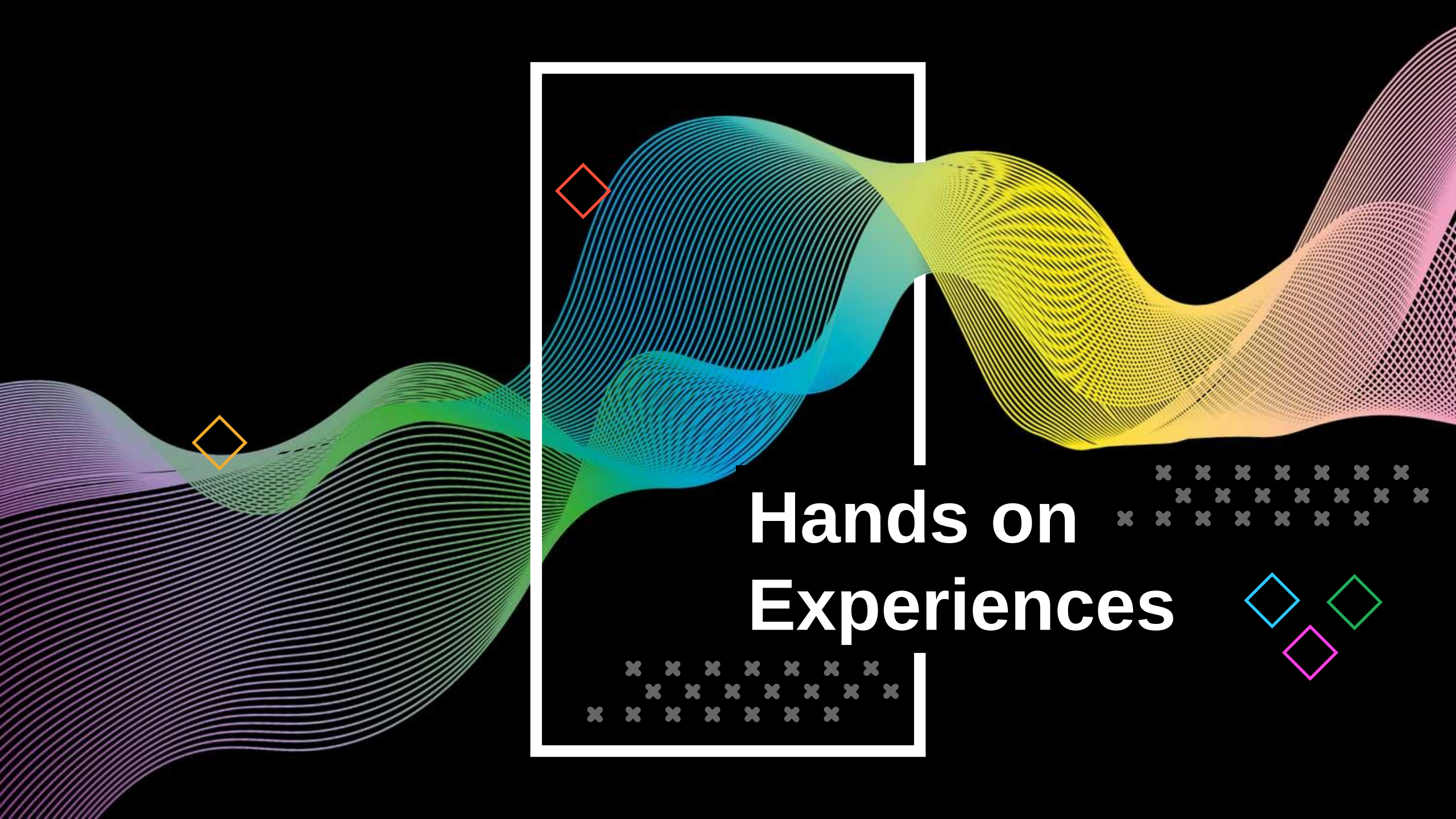
SLR with Bibliometric analysis

Meta Analysis



Meta Analysis using Structured Equation Modeling

Multilevel Meta Analysis


Hands on
Experiences


THANK YOU