ATHENA
EUROPEAN UNIVERSITY

Systematic literature review

Renata Močnik, University of Maribor Library

University of Maribor
University of Maribor Library

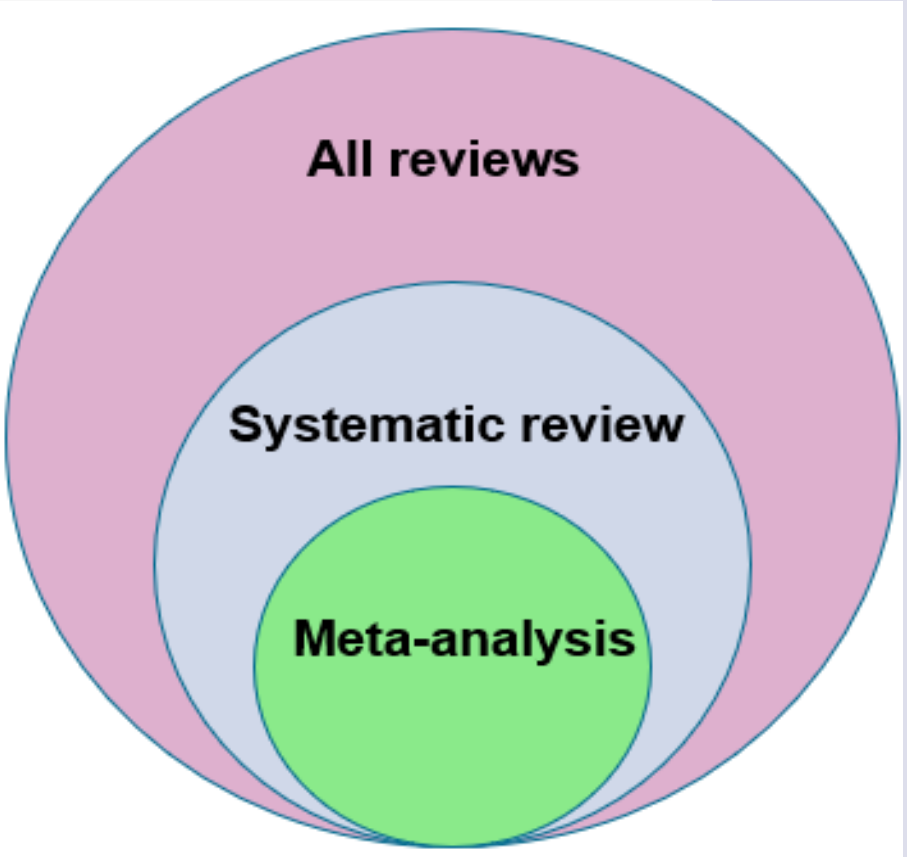
#EuropeanUniversities

Building
the universities
for the future

European Commission

ATHENA

- **Summarizes** a topic that is **broad** in scope
- **Qualitative**
- May use sources that are **biased**
- Does not define what types of studies will be included (looks at everything)



- **Systematic review = research study of research studies**
- Answers a **specific question**
- **Defines** a specific search strategy; lists what will be **included and excluded** in articles selected

- Looks at studies from a systematic review
- Purpose: Combines similar studies and pulls **data** to get a **statistically significant** result
- Important because statistical analysis may overturn results of smaller studies

	Systematic review	Literature review
Definition	High-level overview of primary research on an focused question that identifies, selects, synthesizes and appraises all high quality research evidence relevant to that question	Qualitatively summarizes evidence on a topic using informal or subjective methods to collect and interpret studies
Goals	• Answers a focused question • Eliminate bias	• Provide summary or overview of topics
Question	• Clearly defined and answerable question • Recommend using PICO as a guide	• Can be a general topic or a specific question
Components	• Pre-specified eligibility criteria • Systematic search strategy • Assessment of the validity of findings • Interpretation and presentation of results • Reference list	• Introduction • Methods • Discussion • Conclusion • Reference list
Number of authors	• Three or more	• One or more
Timeline	• Months to years • Average eighteen months	• Weeks to months
Requirement	• Thorough knowledge of topic • Perform searches of all relevant databases • Statistical analysis resources (for meta-analysis)	• Understanding of topic • Perform searches of one or more databases
Value	• Connects practicing clinicians to high quality evidence • Supports evidence-based practice	• Provides summary of literature on the topic

Why to do SLR?

ATHENA

- Produces structured quantitative summaries of the field
- Easy to update and reuse during the PhD
- Identify authors
- Can identify datasets for meta-analysis
- Quantify (map) the field and identify research gaps
- Can publish review

CASP (Critical Appraisal Skills Programme)

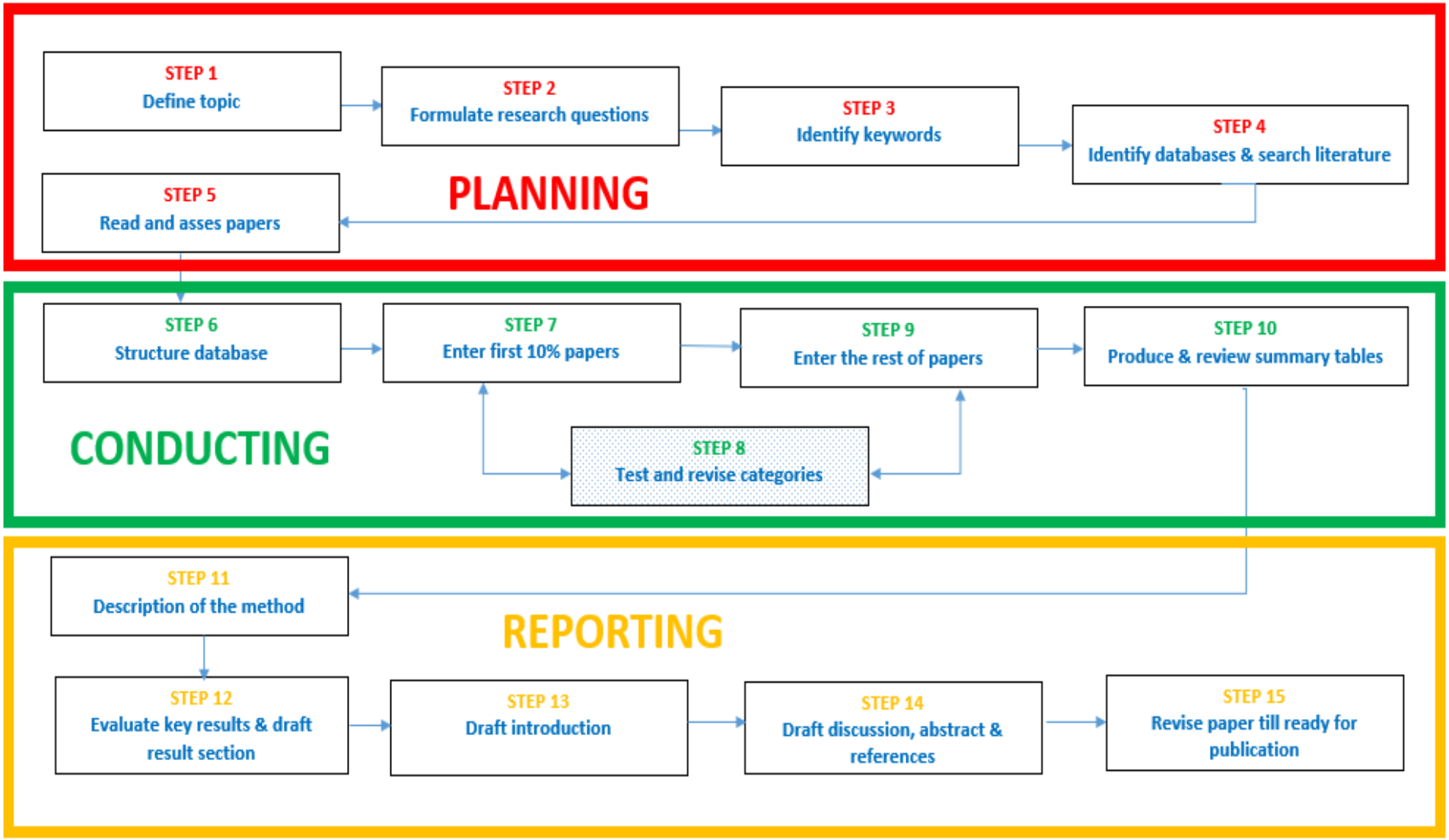
ATHENA

10 questions to help you make sense of a Systematic Review

https://casp-uk.net/casp-tools-checklists/

Step by step process for collecting, analysing data and writing the review

ATHENA



Source: https://research-repository.griffith.edu.au/handle/10072/49021

1st PART – PLANNING
Step 1 – define topic

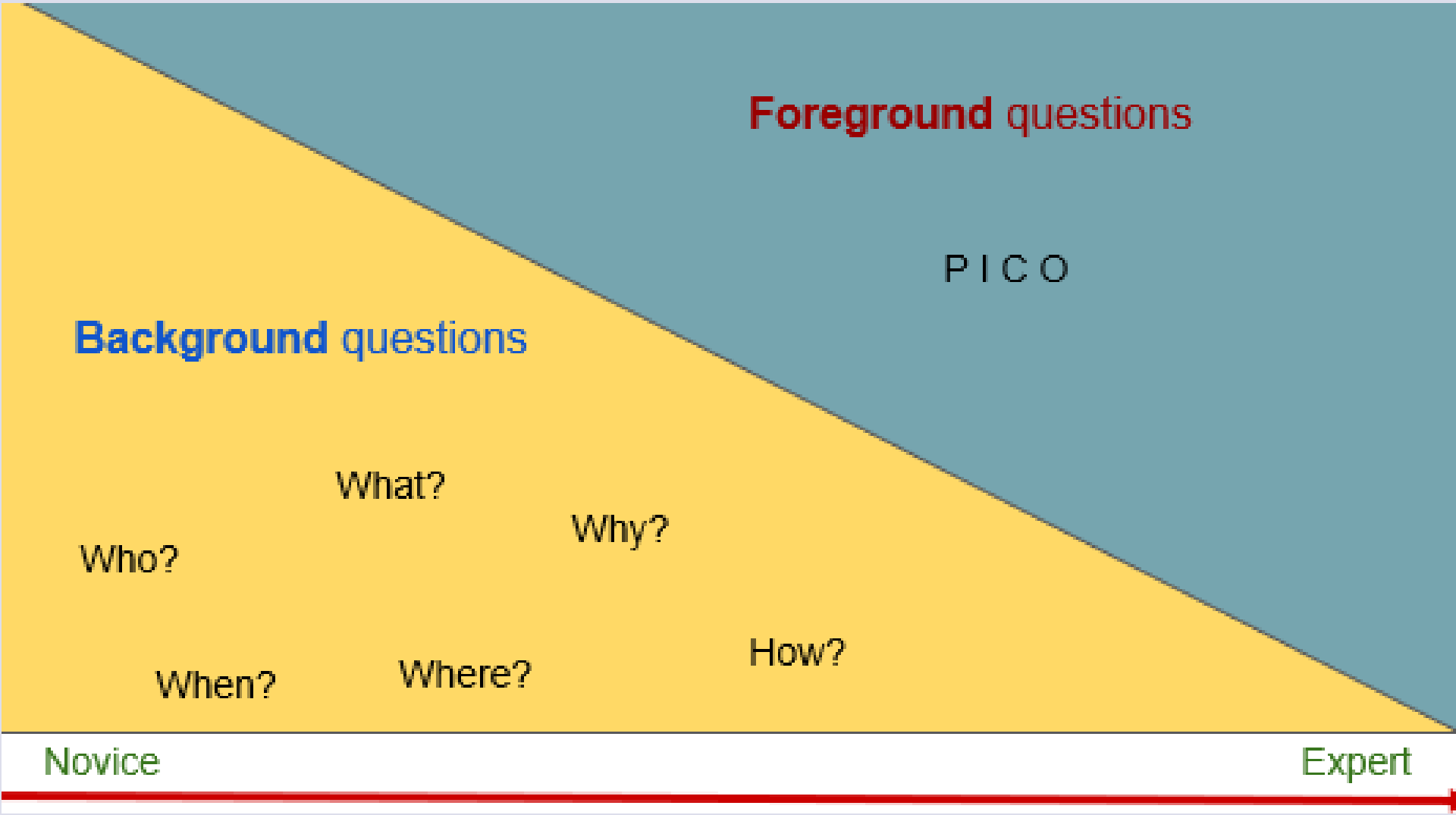
ATHENA

- Originality (Dissertability)
- Relevance
- Interest

Step 2: formulate research question

ATHENA

The most important step in SLR – the research questions guide the entire methodology



Step 2: formulate research question

ATHENA

P I C O (C) – a method to formulating an effective and answerable RQ

Population (object of research/problem)	**I**ntervention, exposure	**C**ontrol, comparison	**O**utcome of interest	**(C)**ontext
Who or what is the object of research? In human population which age, sex, ethnic groups…)	*Methodology, technology, procedure, tools (…what, how?)*	*What is the alternative intervention or control that you compare the Intervention to?*	*What do you want to achieve? What are you going to measure and how?*	*Academic, industrial environment*
		**Year, season, time period**		**Europe**

Step 3: key-words

in collaboration with the mentor and a librarian

ATHENA

- At least 4 different expressions for one activity/subject/problem
- Combining key-words (quotes, searching order, search strings of different combinations, Boolean operators).
- Multiple searches of the same collection are required to find all documents with a search request.
- **Let's not forget about:**
- synonyms, abbreviations, related terms, UK and US spellings, singular/plural forms of words

Step 4: searching the literature

ATHENA

- Library catalogue
- Databases for specific areas
- Multidisciplinary collections
- E-books
- Official websites
- Reference lists
- Grey literature
- Contact the librarian

Step 4: example of a search string

ATHENA

(BPMN **OR** *"BUSINESS PROCESS MODEL AND NOTATION"* **OR** *"BUSINESS PROCESS MODELLING NOTATION"* **OR** *"BUSINESS PROCESS MODELING NOTATION")*

AND

("SYSTEMATIC REVIEW" **OR** *"RESEARCH REVIEW"* **OR** *"RESEARCH SYNTHESIS"* **OR** *"RESEARCH INTEGRATION"* **OR** *"SYSTEMATIC OVERVIEW"* **OR** *"SYSTEMATIC RESEARCH SYNTHESIS"* **OR** *"INTEGRATIVE RESEARCH REVIEW"* **OR** *"INTEGRATIVE REVIEW"* **OR** *"SYSTEMATIC DEFINITION"* **OR** *"SYSTEMATICAL DEFINITION"* **OR** *"SYSTEMATIC THEORY"* **OR** *"SYSTEMATIC SURVEY"* **OR** *"POLLS"* **OR** *"EVALUATION"* **OR** *"SYSTEMATIC DISPLAY")*

Source: Kocbek, M., Analiza sprejetosti standarda BPNM na osnovi sistematičnega pregleda literature, Maribor, 2012, str. 29.

Documentation of primary documents

ATHENA

Source	Documentation
Databases	Name Search string Date of the search Searching period
Journals	Journal title Searching time period Searching areas
Conference papers	Name of the conference Place and date of the conference Name of the journal in which the article was published
Unpublished studies	Contacts of the research group or individual Researcher's web address and date
Other sources	Special conditions for access Searching date URL address

Step 5: Read and assess papers
(inclusion and exclusion criteria)

ATHENA

Criteria for evaluating the quality of the primary document:

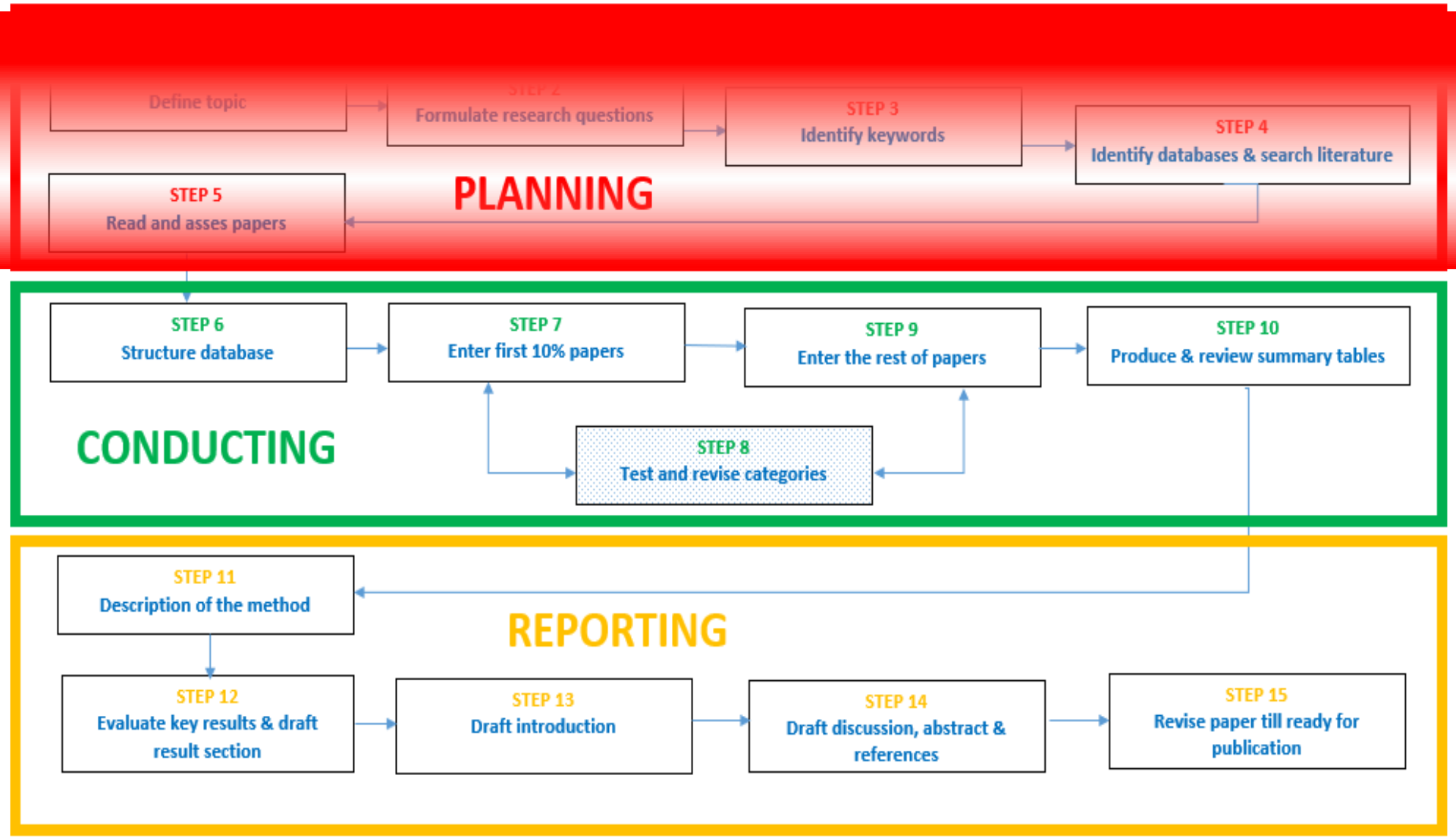
- scientific studies published in academic journals or magazines
- is the source reliable
- does the study have any limitation
- what is the author's point of view

Evaluation according to the CRAAP test.

- C – Currency
- R – Relevance
- A – Authority
- A – Accuracy
- P – Purpose

Step by step process for collecting, analysing data and writing the review

ATHENA



Source: https://research-repository.griffith.edu.au/handle/10072/49021

2nd part – CONDUCTING
Step 6: creating your own review database
Categories about the paper

ATHENA

Autors name, Publishing year, Title, Journal, Abstract…

	A	B	C	D	E	F	G
1	**avtor**	**leto izdaje**	**naslov**	**povzetek**	**oblika**	**objavljeno**	**baza**
2	Hawkes, Denise; Yerrabat	2018	A Systematic Review of Research on Pr	Alongside the growing numbers of professional doctorate programmes being offered within universities in the past 20 years, there has been a growth in the academic **literature** associated with various aspects of these research degrees. This **systematic literature review** draws on the evidence of 193 academic papers to map out the existing academic knowledge about professional doctorates and highlight the gaps that this special issue aims to address. We use a simple vote-counting approach to categorizing the identified papers, considering: the type of professional doctorate studied, the country in focus, the main themes explored, the research methods used and the year of publication. This **review** highlights the need for academic work in this area to move beyond individual case studies of practice on programmes towards developing principles of practice for professional doctorates as a whole. This special issue hopes to start that academic conversation.	članek	Journal Articles; Informatic	ERIC
	Silvana Aciar; Carina Soledad González-González Pablo Vicente Torres-Carrión; Germania Rodríguez-Morales	2018	Methodology for **systematic literature review** applied to engineering and education	A systematic review of the scientific literature in a specific area is important for identifying research questions, as well as for justifying future research in said area. This process is complex for beginners in scientific research, especially if you have not developed skills for searching and filtering information, and do not know which high-level databases are relevant in their field of study. The method proposed leads the researcher from "My" to "The" current state of the problem; we propose an	prispevek s konference	2018 IEEE Global Engin	IEEE

https://ieeexp...umber=8360187

Step 6: creating your own review database

ATHENA

Work out categories and subcategories:

- *About the paper*
- *Who does the research*
- *Where (City, State, Country, Continent, Climatic zone, General habitat types, others…)*
- *Using what methods*
- *What response variables*
- *What subject*
- *What statistics (if used)*
- *What found*

Step 6: creating your own review database

ATHENA

Weighting methods/studies
Categories about the methods used

What you include depends on the discipline

- *By types of evidence (randomized control trials, before-after control, cohort study, experiments with control, case studies…)*
- *Observational vs experimental?*
- *Natural science, social science or mixed?*
- *Which qualitative approaches (interviews, content and text analysis, case studies, observations, group discussion, archival research, field experiments…)?*
- *Which quantitative approaches (questionnaire surveys)*

Step 6: creating your own review database

Weighting methods/studies

Categories about the methods used

ATHENA

Category	Total	USA	Others
Methods used			
Science			
Social science	76	43	33
Natural science	1	1	
Mixed	9	6	3
Methods			
Interview	53	28	25
Case study	23	11	12
Observation	26	12	14
Survey	27	18	9
Text analysis	14	10	4

Source: https://www.sciencedirect.com/science/article/pii/S1618866712000830

Step 6: creating your own review database

ATHENA

Categories about the geographic location of research

City, State, Country, Continent, Climatic zone, General habitat types… other…

The number of journal papers examining community gardens in different countries and the number of countries authors of papers are from (based on author affiliations).

Country	Community gardens	Authors
USA	51	119
Australia	12	26
Canada	5	17
UK	8	18
South Africa	2	3
Netherlands	1	3
Singapore	1	2
Spain	1	2
Cuba	2	1
Mexico	1	1
Portugal		1
Sweden	1	1
Israel		1
Brazil	1	
Other African countries	2	
Philippines	1	
Total	89	195

[a]Although there were 87 papers, one paper examined gardens in three different countries (Wade, 1987 looked at gardens in Philippines, Zambia and Mexico).

Source: https://www.sciencedirect.com/science/article/pii/S1618866712000830

Step 7: enter around 10% of papers

ATHENA

Based on this literature input, we will test our categories, most likely change and adapt them until we reach optimal conditions.

Step 8: How well do the categories work?

- Are they to narrow or broad?
- Do we need additional values, new subcategories?
- Do the criteria applied to categories work in reality?

REFLECTION NOW SAVES A LOT OF TIME!

Step 9: Enter the rest of the papers

ATHENA

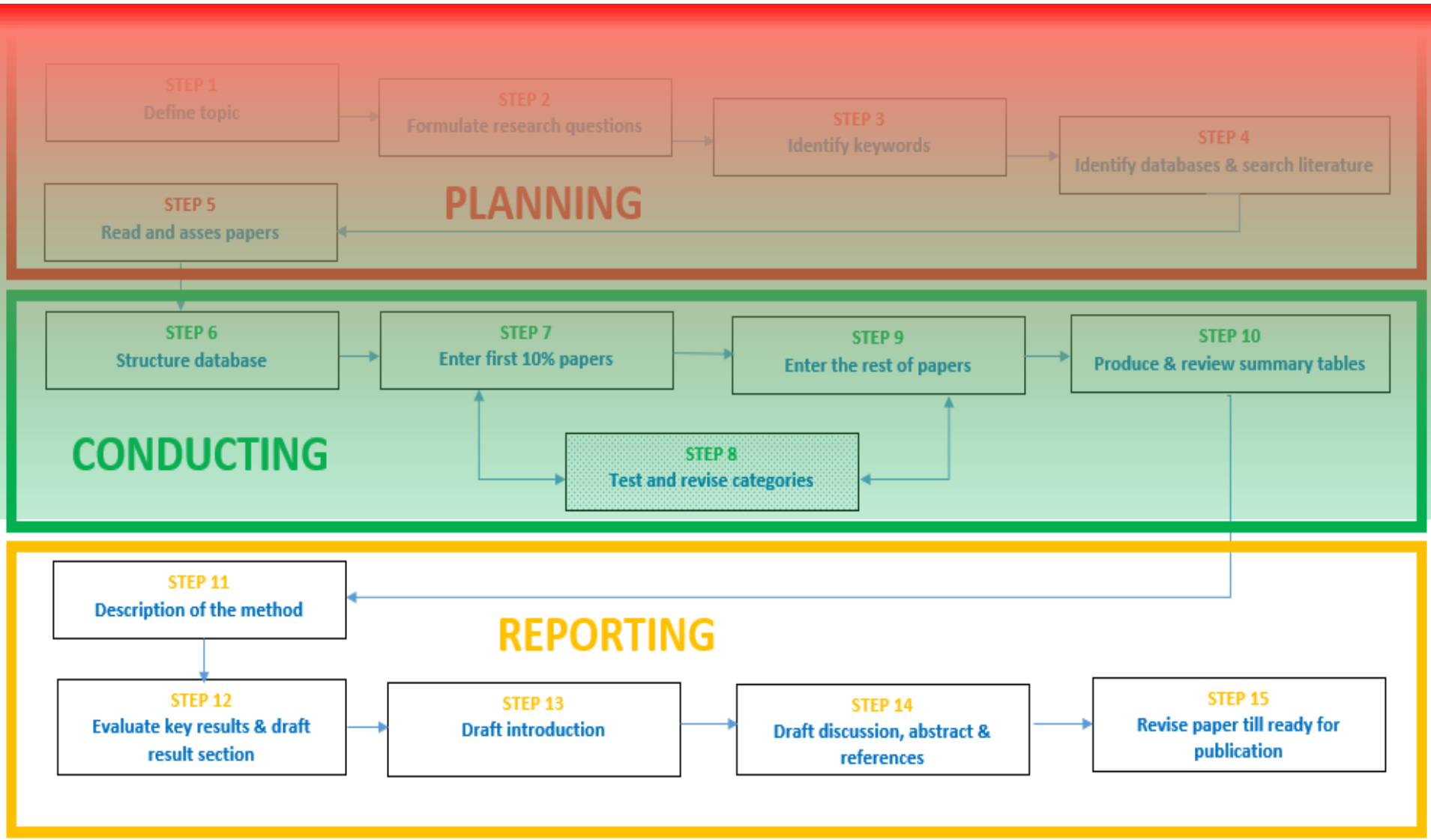
- Again cross check the categories and criteria
- Check that the database is comprehensive (reference lists)

Step 10: Produce and review summary tables so you can…

- Check that the database is accurate (entry errors)
- Start to work out the most important results

Step by step process for collecting, analysing data and writing the review

ATHENA



Source: https://research-repository.griffith.edu.au/handle/10072/49021

PART III – REPORTING
Steps 11 – 15

ATHENA

Although it's a literature review it has a standard paper structure

SECTIONS	ORDER WRITTEN
Abstract	7
Introduction	2 (aims) 5/6 rest
Methods	1
Results	3
Discussion	5/6
Conclusion	4
Reference	8

Source: https://www.youtube.com/watch?v=zAENZ4uQTs4

Part III – REPORT
Step 11: Methods

ATHENA

Need details about:

- Key words
- Databases searched
- Criteria for using papers
- Categories/subcategories – what, why, and how values are assigned
- Data analysis/issues examined

Step 12: Writing the results

ATHENA

The results should document

- How many documents we used (quantitative)?
- Who published them?
- Where has research been done?
- What disciplines do research on this topic?
- What methods are used?
- What`s been found/demonstrated?
- What`s missing – gaps?

Step 13: Introduction

ATHENA

Carefully stepped out argument from the most general to the most detailed – e.g. your aims.

It should consist of ~4-5 paragraphs.

Remember it`s a stepped argument, so everything needs to lead to the aims, describing what you actually did and found.

Step 14: Discussion & Abstract

ATHENA

- Discuss the results in relation to the literature
- Discuss the implications of what you found
- Highlight the gaps

- For the abstract make every word count

Step 15: Revise the paper untill ready for submission

ATHENA

More practice = fewer drafts. Different drafts have different functions.

- Early-drafts are about getting the information on paper
- Mid-drafts are about working out a better way convey the information
- Later-drafts are about checking it`s all there and polishing.

PRISMA protocol

ATHENA

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item
ADMINISTRATIVE INFORMATION		
Title:		
Identification	1a	Identify the report as a protocol of a systematic review
Update	1b	If the protocol is for an update of a previous systematic review, identify as such
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number
Authors:		
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments
Support:		
Sources	5a	Indicate sources of financial or other support for the review
Sponsor	5b	Provide name for the review funder and/or sponsor
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol
INTRODUCTION		
Rationale	6	Describe the rationale for the review in the context of what is already known
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)
METHODS		
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated
Study records:		
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.

Gantt chart for three month project

ATHENA

		October					November				December				
No.	ACTIVITY/TASK	3	10	17	24	31	7	14	21	28	5	12	19	26	
1	Decide topic														
2	Key words searching														
3	Scan and skim of text selection														
4	Reading and note making														
5	Synthesis														
6	Writing														

Source: Jesson, J., Matheson, L. and Lacey, M. *Doing you literature review: Traditional and Systematic Techniques.* London: SAGE, 2011

ATHENA

Thank you!

#EuropeanUniversities

Building
the universities
for the future

European Commission

University of Maribor

University of Maribor Library