



# A systematic exploration of scoping and mapping literature reviews

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## Abstract

Systematic literature mapping can help researchers identify gaps in the research and provide a comprehensive overview of the available evidence. Despite the importance and benefits of conducting systematic scoping and mapping reviews, many researchers may not be familiar with the methods and best practices for conducting these types of reviews. This paper aims to address this gap by providing a step-by-step guide to conducting a systematic scoping or mapping review, drawing on examples from different fields. This study adopts a systematic literature review approach aiming to identify and present the steps of conducting scoping and mapping literature reviews and serves as a guide on conducting scoping or mapping systematic literature reviews. A number of 90 studies were included in this study. The findings describe the steps to follow when conducting scoping and mapping reviews and suggest the integration of the card sorting method as part of the process. The proposed steps for undertaking scoping and mapping reviews presented in this manuscript, highlight the importance of following a rigorous approach for conducting scoping or mapping reviews.

**Keywords** Scoping review · Mapping review · Review methodology · Systematic literature mapping · Card sorting

## 1 Introduction

An essential component of academic research is literature review. A systematic literature review, also known as a systematic review, is a method for locating, assessing, and interpreting all research related to a specific research question, topic, or phenomenon of interest [1].

Scoping and mapping reviews are variations of systematic literature mapping [2]. Both mapping and scoping reviews can help researchers to understand the scope and breadth of the literature in a given field, identify gaps in the research, and provide a comprehensive overview of the available evidence. Systematic literature mapping purposely focuses on a narrower but more general academic or policy issue and does not try to synthesize the results of research to address a particular subject. The scoping review

is exploratory in nature, whereas the mapping review can be conclusive in describing the available evidence and identifying gaps. Mapping review includes a thorough, systematic search of a wide field. It identifies the body of literature that is currently available on a subject and points out any glaring gaps in the evidence [3].

### 1.1 Rationale

Despite the importance and benefits of conducting systematic scoping and mapping reviews, many researchers may not be familiar with the methods and best practices for conducting these types of reviews. This paper aims to address this gap by providing a step-by-step guide to conducting a systematic scoping or mapping review, drawing on examples from different fields.

This study adopts a systematic literature review approach aiming to identify and present the differences and the steps of conducting scoping and mapping literature review. The paper provides practical guidance on how to address common challenges in conducting systematic scoping or mapping reviews, such as dealing with the volume of studies identified, managing the data extraction and synthesis process, and ensuring rigor and reproducibility in the review

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methodology. The main research questions that guide this study are:

RQ1: What is a systematic scoping review and how is it conducted?

RQ2: What is a systematic mapping review and how is it conducted?

RQ3: What are the main differences between systematic scoping and systematic mapping reviews?

Overall, this paper will be a valuable resource for researchers who are interested in conducting a systematic scoping or mapping review. By providing clear guidance and practical examples, the paper aims to promote best practices in systematic scoping and mapping review methodology. The study is organized as follows: The following section presents the methodology of the study, followed by the results showing the process of the scoping and mapping literature review and presenting some examples. Finally, suggestions on how to plan and perform a quality scoping and mapping review are presented.

## 2 Methodology

The methodology of this paper was adopted by Xiao and Watson [4].

### 2.1 Literature search

The search was conducted in two well-known online databases, Web of Science and EBSCOHost, across various disciplines. The searched terms combined keywords related to the performance of scoping and mapping literature review, such as “systematic literature review”, “methodology”, “map”, “mapping” and “scoping”. The title of each

**Table 1** Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
1	The manuscript should have been published between the years 2013–2022	The paper was published before 2013
2	The manuscript should provide guidance on the methodology of <b>mapping/scoping</b> systematic literature review.	Guidance on general systematic literature review and literature reviews on a specific topics were excluded
3	The manuscript presented sufficient data	The manuscript was a short paper that did not provide sufficient data (e.g. abstract papers, poster, presentations etc.)
4	The manuscript was written in English	Publications written in a language other than English were excluded
5	Publications should be accessible through the authors institution	Publications that weren't accessible (required to pay or couldn't access for any other reason) were excluded

manuscript was used to determine its initial relevance. If the content of the title suggested that it would explain the method of the literature review process, we obtained the full reference, which included the author, year, title, and abstract, for additional analysis.

### 2.2 Initial search results

The query string used for the database search is the following: systematic literature review AND methodology AND (“map” OR “mapping” OR “scoping”). Abstract search was conducted in both databases for the last 10 years (2013–2022). A search on EBSCOHost revealed 643 results of which 291 were duplicated and automatically removed. After applying the database filters to limit the articles to peer-reviewed academic journal articles written in English, a number of 102 papers were excluded. Additional 109 papers were duplicated and removed manually. After an initial screening of the titles, a total of 13 studies were identified as relevant to the methodology of the scoping and mapping literature review. A search on Web of Science, revealed 888 results of which 9 were duplicate and removed, and 157 were found to be related to the methodology of scoping or mapping literature reviews after the first title screening. Last search was conducted on the 2nd of November 2022. Both sources revealed 161 related studies, excluding 9 duplicates that were removed.

### 2.3 Inclusion and exclusion criteria

Only studies that provide instructions on how to perform a scoping or mapping review were included in this paper. Reviews of the literature on certain subjects and in languages other than English were excluded. The study is limited to papers published within the last 10 years, aiming to collect recent information for performing scoping or mapping reviews. Inclusion and exclusion criteria can be found in Table 1.

### 2.4 Screening

To further assess the 161 studies' applicability to the study topic, their abstracts were reviewed. The manuscripts were evaluated independently and in parallel by two researchers. The researchers' differing opinions were discussed and settled. Then the full-text of a total of 20 studies was acquired for quality evaluation.

### 2.5 Eligibility and quality evaluation

To further assess the quality and relevance of the studies, the full-text papers were reviewed. Journal articles and

books published by prominent publishers were included in the review as they contained high-quality research. Because there is no peer review procedure, the majority of technical reports and online presentations were excluded.

Two researchers worked independently and simultaneously on evaluating eligibility and quality. Any disagreements between them were discussed and resolved. A total of ten (10) studies were excluded after careful review: one study was excluded because it lacked instructions on how the scoping or mapping review methodology was conducted, three studies were excluded because the methodology was not related to scoping or mapping review, while five studies were disregarded because they focused on a particular subject. One of the studies' full text couldn't be accessed. This resulted in ten (10) eligible for full-text analysis.

### 2.6 Iterations

Through backward and forward searching, additional 18 studies were discovered, from which only 10 met the inclusion criteria. The forward and backward search was also used to find manuscripts that applied scoping or mapping literature review methodology. After finding the article that established the scoping or mapping review methodology, articles that had cited the methodology paper to find instances of best practices in different fields were searched. Following consideration of examples' adherence to the methodology, preference was given to planning-related

articles. In total, 90 studies were analyzed in this study, i.e. 10 methodological papers that describe the application of scoping or mapping review, as well as 80 papers that demonstrate the application of the scoping and mapping methodology in different fields, that are used as examples. The PRISMA flow diagram (see Fig. 1) depicts the process of the search strategy [5].

### 2.7 Extraction and analysis of data

Data were extracted in the process of scoping literature reviews, including information with regards to formulating the problem, establishing and validating the review procedure, searching the literature, screening for inclusion, evaluating quality, extracting data, analyzing and synthesizing data, and reporting the findings (Xiao & Watson, 2019). NVivo software was used for all data extraction and coding procedures. Initially, two researchers each took information from articles for cross-checking. The two researchers reached an agreement on what to extract from the publications after reviewing a few articles together. Then the first author classified the data based on the research questions.

## 3 Findings

In this section we present the findings of our review.

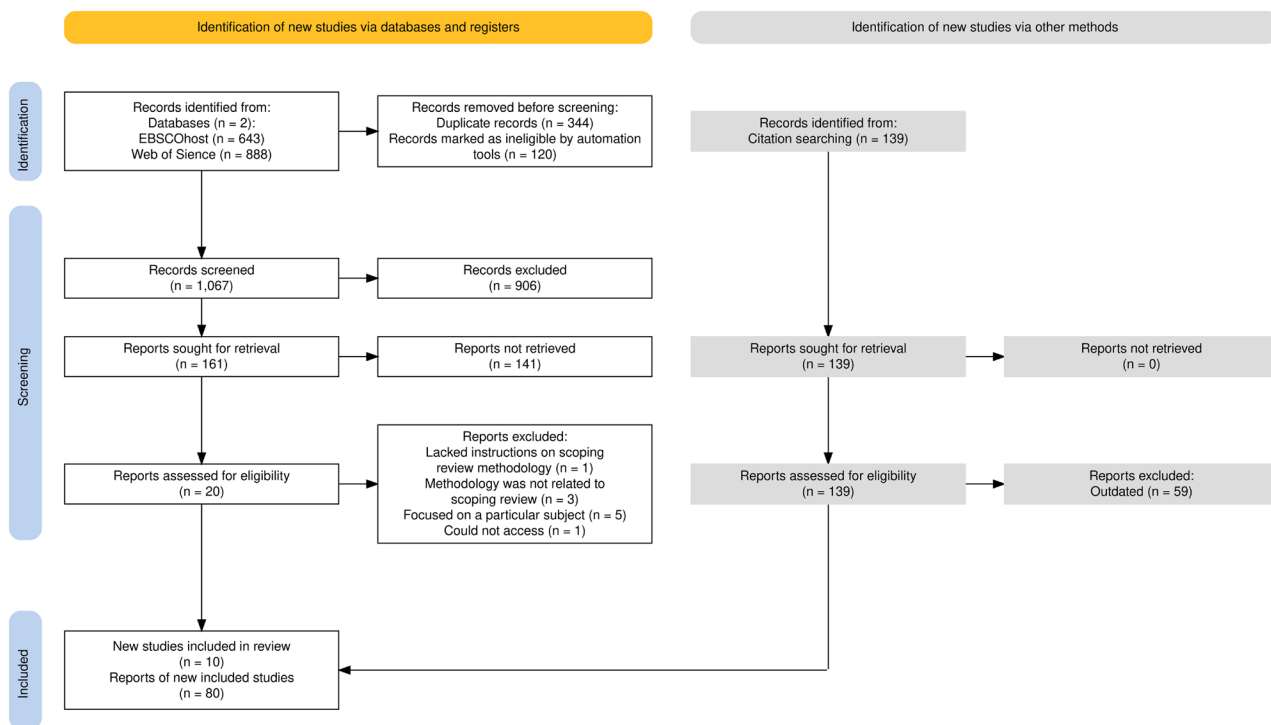


Fig. 1 PRISMA flow diagram

### 3.1 Defining “Scoping” and “mapping” review

According to [2], scoping and mapping reviews are variations of systematic literature mapping that focus on narrower but more general academic or policy issues. A scoping review is exploratory in nature, seeking to identify the nature and extent of research on a particular topic, and can be used to identify gaps in the literature. An example of a research question suitable for a scoping review is “What engagement strategies do educators use in classroom settings to facilitate teaching and learning of diverse students in undergraduate nursing programs?” [6]. A mapping review, on the other hand, is a thorough and systematic search of a wide field of literature that aims to identify the body of literature currently available on a subject and point out any glaring gaps in the evidence. An example of a research question suitable for a mapping review is “What are the currently available animal models for cystic fibrosis” [3]. Overall, each type of review has its own specific aims and can be useful for different types of research questions.

#### 3.1.1 Defining scoping review

There is no single definition for scoping reviews in the literature. According to [7], scoping review is a type of knowledge synthesis that uses a systematic process to map the evidence on a subject and identify key ideas, theories, sources, and knowledge gaps. The goal of a scoping review is to include all relevant information that is available, including ‘grey’ literature, which includes unpublished research findings, therefore including all available literature and evidence, but the reviewers can decide what type of publications they would like to include [8–11].

Scoping review process is sometimes used as a preliminary step before a systematic literature review, in cases where the topic or research area in focus has not yet been extensively reviewed or is complicated or heterogeneous in nature and the types of evidence available remain unclear [3]. For example, while a scoping review might serve as the foundation for a full systematic review, it does not aim to evaluate the quality of the evidence like systematic reviews do [8]. Moreover, scoping review is also referred to as a “pilot study” [12], that can be used as a “trial run” of the entire systematic map; it helps to mold the intended approach for the review and inform the protocol development.

Rapid and scoping meta-reviews were also referred as types of scoping reviews. A “rapid review” is a particular kind of scoping review, which aims to provide an answer to a particular query and can shorten the process compared to a full systematic review [3]. The “scoping meta-review” (SMR) is a scoping evaluation of systematic reviews that offers researchers a flexible framework for field mapping

and a way to condense pertinent research activities and findings, similar to a scoping review [13].

Almost all of the scoping studies identified in the corpus, draw from previews scoping review frameworks, such as the one proposed by [14, 15] and the authors’ manual provided by the Joanna Briggs Institute [11, 16–18].

#### 3.1.2 Defining mapping review

A mapping review, also referred to as a “systematic map”, is “a high-level review with a broad research question” [3] (p.133). The mapping review includes a thorough, systematic search of a wide field. It identifies the body of literature that is currently available on a subject and points out any gaps in the evidence. The mapping review can be conclusive in describing the available evidence and identifying gaps, whereas the scoping review is exploratory in nature [3].

The term “mapping” is used to describe the process of synthesizing and representing the literature numerically and thematically in tables, figures, or graphical representations, which can be thought of as the review output. Mapping enables researchers to pinpoint potential areas for further study as well as gaps in the literature [19].

Systematic mapping uses the same strict procedures as systematic reviews do. However, systematic mapping can be used to address open or closed-framed questions on broad or specific topics, because it is not constrained by the requirement to include fully specified and defined key elements [12]. Systematic mapping is especially useful for broad, multifaceted questions about an interesting topic that might not be appropriate for systematic review because they involve a variety of interventions, populations, or outcomes, or because they draw on evidence that is not just from primary research [12].

### 3.2 Process of conducting mapping and scoping reviews

As noted in the previous sections, mapping reviews and scoping reviews both aim to provide a broad overview of the literature, but the former focuses on the scope of the literature while the latter focuses on the nature and extent of available evidence on a specific research question or topic. In understanding the process for conducting mapping and scoping reviews, we adopted the eight steps proposed by Xiao and Watson [4] that are common for all types of reviews: (1) Formulate the problem; (2) Establishing and validating the review procedure; (3) Searching the literature; (4) Screening for inclusion; (5) Evaluating quality; (6) Extracting data; (7) Analyzing and synthesizing data; (8) Reporting the findings. The steps are explained in detail below and describe the methodology for both scoping and

**Table 2** Review types, steps and characteristics

Steps and Characteristics	Review Types	
	Scoping Review	Mapping Review
<b>Step 1. Formulating the problem</b>		
Uses a broad research question	✓	✓
Uses a wide range of research question types	✓	✓
Follows PICO/PCC format	✓	✓
<b>Step 2. Establishing and validating the review procedure</b>		
Follows a systematic process and protocol	✓	✓
Does early, exploratory evaluations of the body of literature	✓	✓
Requires at least two reviewers	✓	✓
<b>Step 3. Searching the literature</b>		
Conducts systematic search of a wide field	✗	✓
Search in multiple databases	✓	✓
<b>Step 4. Screening for inclusion</b>		
Employs inclusion and exclusion criteria	✓	✓
Includes grey literature	✓	✓
<b>Step 5. Evaluating quality</b>		
Undergoes quality assessment	✗	✗
<b>Step 6. Extracting data</b>		
Follows iterative data extraction process	✓	✓
Is restricted to important study characteristics and outcomes	✗	✓
<b>Step 7. Analyzing and synthesizing data</b>		
Synthesises the body of literature	✓	✓
Undergoes in-depth data analysis	○	✗
Identifies literature gaps and trends	✗	✓
<b>Step 8. Reporting the findings</b>		
Provides visualisations of the body of available literature	✗	✓
Includes PRISMA flow diagram	✓	✗

The symbols in the above table have the following meaning: ✓ supported, ○ somewhat supported, ✗ not supported

mapping reviews, distinguishing their differences where applicable. A summary of the review types along with their characteristics and steps as identified from the literature are presented in Table 2.

**3.2.1 Step 1 formulate the problem**

The first step for undertaking a mapping or a scoping review is to formulate the problem by setting the research question that should be investigated, taking into account the topic’s scope [12]. It is important to clearly state the review objectives and specific review questions for the scoping review. The objectives should indicate what the scoping review is trying to achieve [10, 20].

In mapping reviews, it can be helpful to create a conceptual framework or model (visual or textual) to describe what will be explored by the map when determining the mapping review’s scope. It should also be determined whether the

**Table 3** Research Question Formats for scoping and mapping reviews

Question Format	Question Format Explanation	Example
PICO	Population, Intervention, Comparator and Outcome	<i>Does ultrasound (I) alter the immune reaction (O) of peripheral solid tumors in humans and animals (P) compared to control conditions without ultrasound (C)?</i> (Rix et al. 2022)
PCC	Population, Concept and Context	<i>What quality-of-life questionnaires are available for pediatric patients (P) following tonsillectomies with or without adenoidec-tomies (C) for chronic infections or sleep-disordered breathing (C)?</i> (Peters, Marnie, et al. 2020)

topic’s scope is broad, specific, or likely to be supported by a substantial body of evidence [12].

**3.2.1.1 Defining the research question(s)** Prior to beginning their search and paper selection process, the authors should typically define their research question(s) [3]. There are specific formats that are recommended for structuring the research question(s), as well as the exclusion and inclusion criteria of mapping and scoping reviews [21] (see Table 3).

PCC (Population, Concept, and Context) and PICO format (Population, Intervention, Comparator and Outcome) are often used in scoping and mapping reviews. It is recommended that research questions for scoping reviews follow the PCC format and include all of its components [17, 18, 21]. Information about the participants (e.g. age), the principal idea or “concept,” and the setting of the review, should all be included in the research question. The context should be made explicit and may take into account geographical or locational considerations, cultural considerations, and particular racial or gender-based concerns [10].

Researchers use the PCC format in order to determine the eligibility of their research questions, as well as to define their inclusion criteria (e.g [22–26]). Most scoping reviews have a single main question, but some of them are better served by one or more sub-questions that focus on specific PCC characteristics [8, 18].

**3.2.2 Step 2. Establishing and validating the review procedure**

A protocol is crucial for scoping and mapping reviews because it pre-defines the scoping review’s goals and procedures [11, 17, 18, 20], it clearly states all methodological decisions since the very beginning [2], and it also specifies the strategy to be used at each stage of the review process [12]. Similar to all systematic reviews, scoping reviews

start with the creation of an a-priori protocol that includes inclusion and exclusion criteria that are directly related to the review's objectives and questions [7, 11, 17, 18, 20]. In order to decrease study duplication and improve data reporting transparency, the use of formalized, registered protocols is suggested [18, 19]. The international prospective register of systematic reviews, known as PROSPERO, states that scoping reviews (and literature reviews) are currently ineligible for registration in the database. While this could change in the future, scoping reviews can currently be registered with the Open Science Framework (<https://osf.io/>) or Figshare (<https://figshare.com/>), and their protocols can be published in select publications, including the JBI Evidence Synthesis [18].

Scoping and mapping reviews should require at least two reviewers in order to minimize reporting bias, as well as to ensure consistency and clarity [3, 16–18]. The reviewers should include a plan for the results presentation during the protocol development, such as a draft chart or table that could be improved at the end when the reviewers become more familiar with the information they have included in the review [17, 18].

### 3.2.3 Step 3. Searching the literature

Searching the literature requires to prepare a search strategy, decide on search terms, search databases or journals, and perform a manual search [27]. For example, deciding on search terms, can follow an iterative process that is further explained in the sub-section below. Thinking about searching in terms of broader to narrower strategies is helpful. Fewer databases and/or journals will be checked out in narrower searches (search only in the title, keywords, and abstract fields), which are frequently used in scoping reviews, while multiple databases can be checked for mapping reviews [2].

#### *Search strategy*

Mapping and scoping review search should aim to be as thorough as possible [12] to find both published and unpublished evidence. An inclusive approach is frequently preferred for scoping reviews to prevent potential omission of crucial information [10, 17, 18].

According to JBI, there should be a three-step search process for scoping reviews [10, 17, 18]. The first step is a quick search of at least two databases followed by a text word check of the article's title, abstract, and body of text that are then analyzed. All determined index terms and keywords are used in the second stage across all included databases. In the third stage, additional studies should be looked up in the identified reports and articles' reference lists [10, 11, 18]. The reviewers may look solely at the reference lists of the studies that were chosen from the full-text and/or

included in the review, or they may look at the reference lists of all identified studies. In any case, it needs to be made very clear which group of studies will be looked at [8, 11, 18]. As reviewers gain more familiarity with the body of available evidence, new keywords, sources, and possibly helpful search terms may be found and incorporated into the search strategy, hence the search for a scoping review may be quite iterative. If so, it is crucial that the entire search process and the outcomes are open to scrutiny and audit [11, 18].

In the same line, it is recommended for mapping reviews to search multiple databases [2] in all pertinent searchable fields (e.g., title, abstract, keywords, etc.) [3]. Thematic keywords, along with all of their synonyms and regional/temporal variations, are joined together to form Boolean strings using Boolean signs. Building looser, multiple Boolean strings instead of well-targeted ones (for example, using OR instead of AND, NOT, and exact phrases, respectively) is preferable. The latter runs the risk of omitting crucial references, whereas the former may return a sizable sample of sparsely relevant references [2]. Focusing the search on a specific component and then filtering all the results can be more effective for mapping reviews [3].

### 3.2.4 Step 4. Screening for inclusion

Screening and choosing the studies to be included in a review are the main objectives of this phase. According to [27], there are two levels of screening. Titles and abstracts are scanned in the first level to limit the range of the studies to be included, while full texts are scanned in the second level to re-examine the relevance of the studies and to settle disagreements between reviewers regarding the study selection. Discussions, meetings, consulting a third reviewer, and determining inter-rater reliability/agreement (using Cohen's kappa coefficient or intraclass correlation coefficient) are the most typical ways to resolve disagreements. Soaita et al. (2020) [2] also support that the sample of retrieved references should be 'cleaned-up' once it has been finalized and duplicates have been automatically removed.

Different methodological approaches, including primary research articles, summary articles, opinion pieces, and grey literature, can all be included in the literature that scoping reviews identify and analyze [7, 18, 19], but they may also serve as an exclusion criterion [2]. Peters, Godfrey, et al. (2020) [18] advice against limiting source inclusion based on language unless there are compelling justifications for doing so (such as practical considerations).

According to the PRISMA extension for scoping reviews (PRISMA-ScR), a description of the study selection process must be provided in both a narrative and flow diagram format. Including the date of the most recent literature search,

enables the reader to assess how current the scoping review is [7].

**3.2.4.1 Inclusion and exclusion criteria** Inclusion criteria offer a framework on which the reviewers can decide which sources to include in the scoping review. To ensure transparency and replicability, the exclusion and inclusion criteria need to be documented [7, 8, 10, 11, 17]. Authors should specify any limitations by year, language, publication status, or other factors, and explain why each one was put in place [7].

When it comes to mapping reviews, criteria should be created whenever possible with participation from stakeholders. Depending on the type of research questions, stakeholders may include practitioners, designers, policy makers, scientists and research funding bodies, but attention should be paid to avoid bias [12].

### 3.2.5 Step 5. Evaluating quality

Scoping and mapping reviews are not concerned with quality assessment as a criterion for inclusion [2]. Assessments of reporting quality and bias risk are typically outside the scope. Although it is possible to extract study characteristics that reflect study and reporting quality, bias cannot be assessed against a specific hypothesis if a mapping review is exploratory [3].

### 3.2.6 Step 6. Extracting data

The process of data extraction for a scoping review is also known as “charting the results”. A draft charting table or form needs to be created to capture the key details about the relevance of the included studies to the review question, as well as the characteristics of the included studies. The data extraction process can be iterative, with the charting table being constantly updated.

The reviewers should become familiar with the source results and test the extraction form on two or three studies to ensure that all relevant results are extracted [7, 8, 10, 11, 17, 18, 28]. In order to increase reporting transparency, authors should explain the main revisions with a justification if the charting process was iterative (i.e., the form was continuously updated). If appropriate, details about the procedures used to collect and verify information from the researchers of the included sources of evidence should be provided [7]. Author(s), year of publication, source origin, country of origin, objectives, purpose, study population, sample size, methodology, intervention type and comparator, concept, duration of the intervention, how outcomes are measured, and key findings that are related to the review question are

all types of information that may be extracted [7, 8, 10, 11, 17].

When it comes to data extraction for mapping reviews, it is restricted to important study characteristics and outcomes due to the size of a mapping review [3]. The process of mapping is intended to produce a practical and organized resource that provides enough detail about studies to be helpful in further work [12].

To move beyond a straightforward list of citations, it is crucial to maintain a high level of clarity throughout any databases that are created. Studies that are discussed in several papers or that seem to be connected should be marked in the database. In the future, this helps prevent the double counting of research findings in syntheses that might overlook connections between study lines in the databases [12].

Aiming to capture the key characteristics of the included studies in the scoping and mapping reviews, we suggest the use of a guiding table for extracting data (see Supplementary\_Material\_1\_Guiding\_Table).

### 3.2.7 Step 7. Analyzing and synthesizing data

Authors may extract results and map descriptively. Simple frequency counts of concepts, populations, characteristics, or other fields of data will suffice for many scoping reviews [17, 18]. In-depth analysis of quantitative data is not typically required in scoping reviews, although in some cases the authors may take into consideration a more advanced analysis depending on the nature and purpose of their review. A meta-analysis or interpretive qualitative analysis is probably not necessary in scoping reviews [17, 18].

When it comes to mapping reviews, no results synthesis is carried out [12]. Different analytical approaches can be used to map chronological, geographical, conceptual, and thematic trends, which include some form of coding, once the sample has been limited to the pertinent references [2]. It is possible to identify correlations, trends, gaps, and clusters using simple numerical accounts of frequencies in each category (for example, the number of studies looking at a specific species) and more complex cross-tabulations (for instance, the number of studies looking at the effectiveness of a specific intervention, in a particular farming system, for a named species). Users have access to the map and can query it to find information pertaining to any chosen combinations of the subsets of the meta-data [12].

### 3.2.8 Step 8. Reporting the findings

Authors should specify exactly how the evidence will be presented, whether it be in a narrative format, table, or visual representation, such as a map or diagram [7].

In scoping reviews, a summary of all the relevant information gathered can be presented [8] using a logical and descriptive summary of the findings based on the research questions [10, 11, 17]. The distribution of studies by year or period of publication, countries of origin, field of intervention, and research methodologies, may be displayed in the tables and charts accompanied with a narrative summary that explains how the results relate to the review's objectives [7, 11, 17, 18].

The conclusions should be consistent with the review objective or question based on the findings of the scoping review [10]. Following the conclusions, specific recommendations for future research based on gaps in knowledge identified by the review results can be presented. Because of the lack of a methodological quality appraisal, recommendations for practice may be unable to be developed; however, suggestions based on the conclusions may be made [10].

A scoping review's results section should include a PRISMA flow diagram and details the outcomes of the search strategy and selection procedure [7, 17] outlining the grounds for exclusion at the full-text level of screening [7]. For example, a study [29] used the PRISMA-ScR extension for scoping reviews to ensure all important sections have been covered in their review.

Mapping reviews may place more emphasis on describing the evidence. The use of pivot tables and pivot charts is helpful for quickly visualizing the amount (and quality, if it is measured) of evidence across a variety of meta-data variables [12]. Such visualizations can display the quantity of research, the conclusions of a critical appraisal, the sample size across nations, outcomes, populations, or variables. These visualizations can contain categorical variables as additional dimensions. The geographic distribution of study effort and type may be particularly important in mapping reviews with a global or large-scale reach [12].

## 4 Discussion

This systematic literature review aimed to describe the process of conducting mapping and scoping literature reviews. In summary, the main difference between the two types of reviews is in their focus and scope. Mapping reviews provide a comprehensive overview of the literature while scoping reviews identify gaps and inconsistencies in the literature and outline potential areas for future research.

A lot of the methodological papers included in this systematic literature review (e.g [10, 19, 28]), referred to the "consultation process" as an additional, optional step that has been suggested by [14]. In this stage, subject experts or potential review users like practitioners, consumers,

and policymakers may be consulted [8]. Researchers argue that this step should be mandatory [15, 28]. In agreement with Levac et al.'s [15] choice, Daudt et al. [28] encourage the use of the consultation stage whenever it is practical because it adds richness to the entire research process and, consequently, the findings. Despite the fact that stakeholder consultations can make scoping review planning and execution more difficult, they guarantee that the findings are pertinent to educational practice and/or policies [19].

Scoping and mapping reviews should require more than one author to eliminate bias and ensure their quality. The card-sorting technique is suggested to be employed within the review process as a means for resolving discrepancies between the stakeholders and come to an agreement on the categorization and evaluation of the data to be included. Other studies (e.g [30–33]), propose the card-sorting technique as a method for resolving disagreements between people's disparities, as well as to evaluate and verify extracted themes from datasets. Card sorting is a quick and reliable sorting method that finds patterns in how users would expect to find content or functionality. Due to the patterns and insights it exposes about how people organize and categorize content, card sorting is a successful approach for resolving categorization disagreements [34]. According to Wood and Wood [35], the majority of card sorting projects involve an open sort, where participants receive a list of items and are asked to organize them in the most appropriate way. However, in some cases, a pre-existing set of categories is given to the participants, the so-called closed card sorting project. This assumes that the existing categories are already well-organized, and the goal is to make minor adjustments. Wood and Wood [35], suggest that it's best to start with an open sort and analyze the data before conducting a closed sort for validation. If a closed sort is necessary, it should be kept simple, and the results may not be optimal. For example, in a study [30] that aimed to review the use of makerspaces for educational purposes, the card sorting technique was used for the development of the coding scheme. A three-member academic committee, consisting of three professors took part in the card sorting exercise where they went through the abstracts of the relevant papers and were asked to categorize each manuscript after discussion. They then categorized the manuscripts in the three major themes and 11 subcategories that emerged during the card sorting exercise [30]. Similarly, the authors of [31] employed the card sorting technique in their research in order to agree on the main categorization and sub-categorization of the articles identified for inclusion in their review. Card sorting can be integrated as an additional step when conducting scoping and mapping reviews, as it provides useful insights from the experts' perspective and makes the mapping process more inclusive (see Fig. 2).



## 5 Conclusion

Scoping and mapping reviews need a methodological framework that is rigorous, consistent, and transparent, so that the results can be trusted and the review replicated. This provides enough information for the readers to evaluate the review’s accuracy, relevance, and thoroughness [8]. Scoping reviews should be carried out in accordance with established methodological guidance and reported using reporting standards (like PRISMA-ScR) guidelines [36]. The proposed steps for undertaking scoping and mapping reviews presented in this manuscript, highlight the importance of following a rigorous approach for conducting scoping or mapping reviews. Overall, this paper is a valuable

resource for researchers who are interested in conducting a systematic scoping or mapping review in different fields and are looking to apply these review methods to their own research questions.

### 5.1 Limitations and future work

This study does not lack limitations. As specific keywords and specific databases were searched, not all relevant work is included. The study was also limited to the past 10 years, letting out methodologies and frameworks for scoping and mapping literature reviews that were not published within the specific timeframe. The fact that the number of methodological papers identified for inclusion are limited to ten,



Fig. 2 Proposed steps for conducting scoping and mapping reviews

makes it difficult to clarify the differences between mapping and scoping reviews. Therefore, further research is encouraged in order to clarify and verify the differences and similarities between the two. The application of the proposed process for conducting systematic scoping and mapping reviews on specific topics will verify the process.

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**Data availability** The data that support the findings of this study are available from the corresponding author, [EC], upon reasonable request.

## Declarations

**Competing interests** The authors declare no competing interests.

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