Systematic literature reviews

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SYSTEMATIC LITERATURE REVIEWS

- Systematic reviews are syntheses of existing literature on a particular topic, carried out according to a specific protocol in order to:
  - Limit bias errors,
  - Gather all existing information on the subject in question;
  - Critically assess the information collected,
  - Synthesize relevant information that addresses the topic of interest.

SYSTEMATIC LITERATURE REVIEWS

- What are the differences between narrative reviews and systematic literature reviews?

  - The quality of a literature review depends on the quality of the method used and its ability to minimize errors and bias.

  - The main difference lies in the fact that systematic literature reviews are carried out according to a scientific method that can be reproduced while narrative reviews do not employ any method.

WHY?

- Failure to locate important studies can significantly affect results
- To summarize the existing evidence concerning a subject
- To identify any gaps in current research in order to suggest areas for further investigation
- To provide a framework background in order to appropriately position new research activities .

WHAT ARE THE DIFFERENCES BETWEEN NARRATIVE REVIEWS AND SYSTEMATIC LITERATURE REVIEWS?

Feature	Narrative reviews	Systematic reviews
Question	comprehensive	specific
Sources and Research	Not specified, subject to bias.	Sources are generally representative and research methods are referenced.
Selection of articles	Selection methods are not specified, subject to bias.	Based on predefined criteria that are applied to all articles
Evaluation	Variable	Rigorous
Synthesis	Generally qualitative	Generally quantitative
Inferences	Occasionally based on evidence	Generally based on evidence

SYSTEMATIC LITERATURE REVIEWS

It usually involves 6 main steps

1. Formulate the problem
2. Locate and select studies
3. Evaluate the selected studies
4. Collect the data
5. Analyze and present the results
6. Interpret the results

1. FORMULATE THE PROBLEM

Development of a review protocol

- Background
- research questions
- search strategy (search terms and resources to be searched)
- study selection (inclusion and exclusion criteria)
- Study quality assessment checklists and procedures
- data extraction strategy
- project timetable

1. FORMULATE THE PROBLEM

- A specific problem (P) is tackled using some specific constraints, methods and or approaches (C) to develop a system application ou algorithm (S).
- GOAL: What existing solutions are available, how do they compare,what the strengths of the evidence is and what implication these solutions have.
- RQ1: what are the existing solutions to (P)?
- RQ2: how does the different solutions found by addressing RQ1 compare to each other with respect to (C)?
- RQ3: what is the strength of the evidence in support of the different solutions ?
- RQ4: what implications will these findings have when creating (S)?

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Review

Methodological Quality of User-Centered Usability Evaluation of Ambient Assisted Living Solutions: A Systematic Literature Review

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Abstract: This study aimed to determine the methodological quality of user-centered usability evaluation of Ambient Assisted Living (AAL) solutions by (i) identifying the characteristics of the AAL studies reporting on user-centered usability evaluation, (ii) systematizing the methods, procedures and instruments being used, and (iii) verifying if there is evidence of a common understanding on methods, procedures, and instruments for user-centered usability evaluation. An electronic search was conducted on Web of Science, Scopus, and IEEE Xplore databases, combining relevant keywords. Then, titles and abstracts were screened against inclusion and exclusion criteria, and the full texts of the eligible studies were retrieved and screened for inclusion. A total of 44 studies were included. The results show a great heterogeneity of methods, procedures, and instruments to evaluate the usability of AAL solutions and, in general, the researchers fail to consider and report relevant methodological aspects. Guidelines and instruments to assess the quality of the studies might help improving the experimental design and reporting of studies on user-centered usability evaluation of AAL solutions.

Keywords: older adults; Ambient Assisted Living; usability; usability evaluation; systematic review

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1. Introduction

The worldwide population is ageing and the related longer life-expectancy represents an extraordinary challenge in terms of public healthcare policies, due to the changing

2. Materials and Methods

This systematic review followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [28]. To perform the systematic literature review, the authors defined a review protocol with explicit descriptions of the methods to be used and the steps to be taken [29]: (i) the research questions; (ii) the search strategies; (iii) the inclusion and exclusion criteria; (iv) the screening procedures; (v) data extraction; (vi) methodological quality assessment; and (vii) synthesis and reporting.

2.1. Research Questions

Based on the analysis of the literature in the field of usability evaluation of digital solutions and previous work of the research team, a lack of consensus in the academic literature regarding the methods, procedures, and instruments being used for evaluating usability of AAL solutions was identified. To have a more in-depth knowledge of the practices on user-centered usability evaluation of AAL solutions, the following research question was formulated:

- RQ1: What is the methodological quality of user-centered usability evaluation of AAL solutions?

This broad question was subdivided into three additional secondary research questions:

- RQ2: What are the characteristics of the AAL studies reporting on user-centered usability evaluation in terms of study demographics, publication date, country of publication, purpose of the AAL reported solution and interaction modalities?
- RQ3: What are the methods (e.g., test methods, inquiry methods or both), procedures (e.g., environment where the usability evaluation is conducted), and instruments being used (e.g., validated instruments or purposively developed instruments)?
- RQ4: Do existing studies on user-centered usability evaluation of AAL solutions follow quality recommendations when assessed against the Critical Assessment of Usability Studies Scale (CAUSS) [30]?

Chapter 13

Usability Evaluation Methods:
A Systematic Review

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ABSTRACT

This chapter aims to identify, analyze, and classify the methodologies and methods described in the literature for the usability evaluation of systems and services based on information and communication technologies. The methodology used was a systematic review of the literature. The studies included in the analysis were classified into empirical and analytical methodologies (test, inquiry, controlled experiment, or inspection). A total of 2116 studies were included, of which 1308 were classified. In terms of results, the inquiry methodology was the most frequent in this review, followed by test, inspection, and finally, the controlled experiment methodology. A combination of methodologies is relatively common, especially the combination of test and inquiry methodologies, probably because they assess different but complementary aspects of usability contributing to a more comprehensive assessment.

2. LOCATE AND SELECT STUDIES

Main information sources in computer science

- Scopus,
- ACM digital library
- IEEE xplore
- ISI web of knowledge
- ScienceDirect
- CiteSeer

Other: Pubmed, MEDLINE

2. LOCATE AND SELECT STUDIES

Criteria to consider:

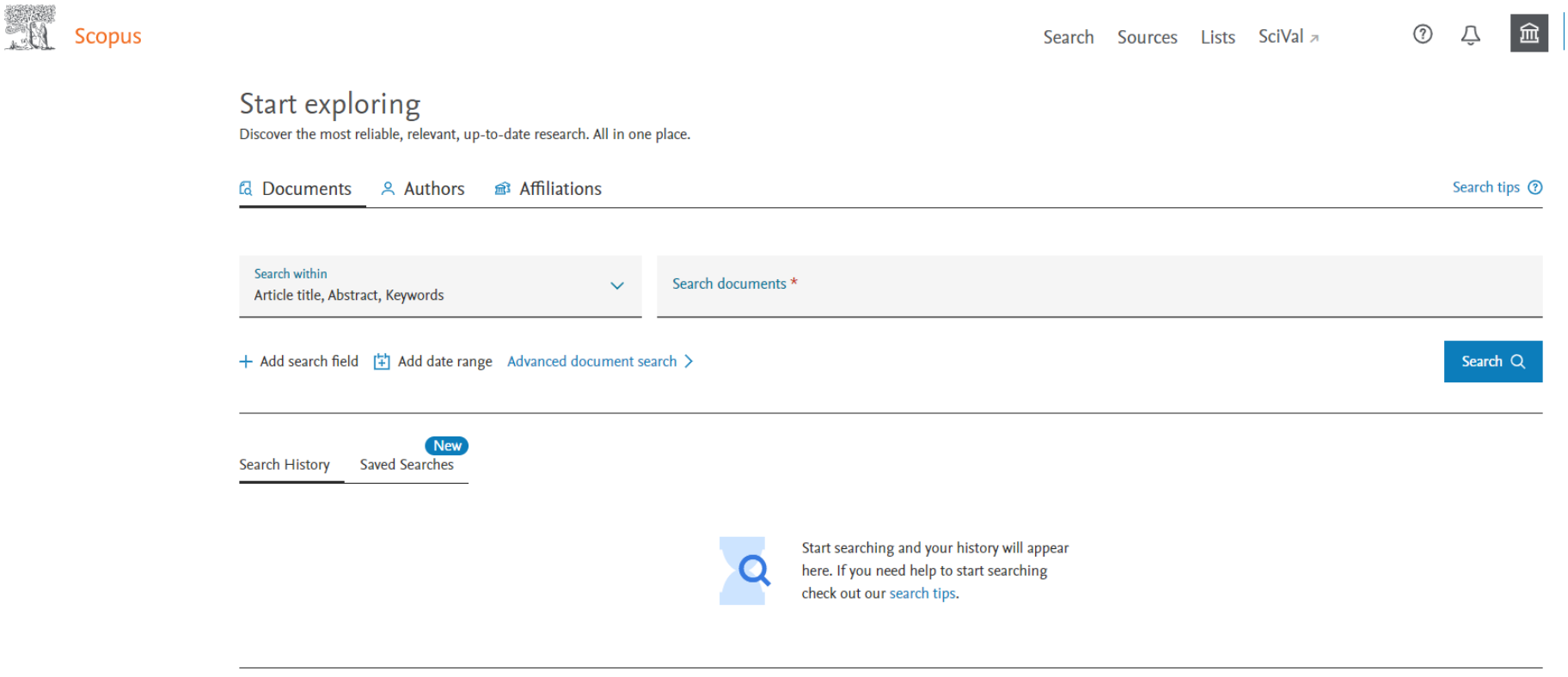
- Data range
- Language
- Study type
- Location of research
- Type of publication

Keywords

- Create a comprehensive list of keywords with alternative spellings
- Sophisticated search strings can be constructed using Boolean string AND's and OR's

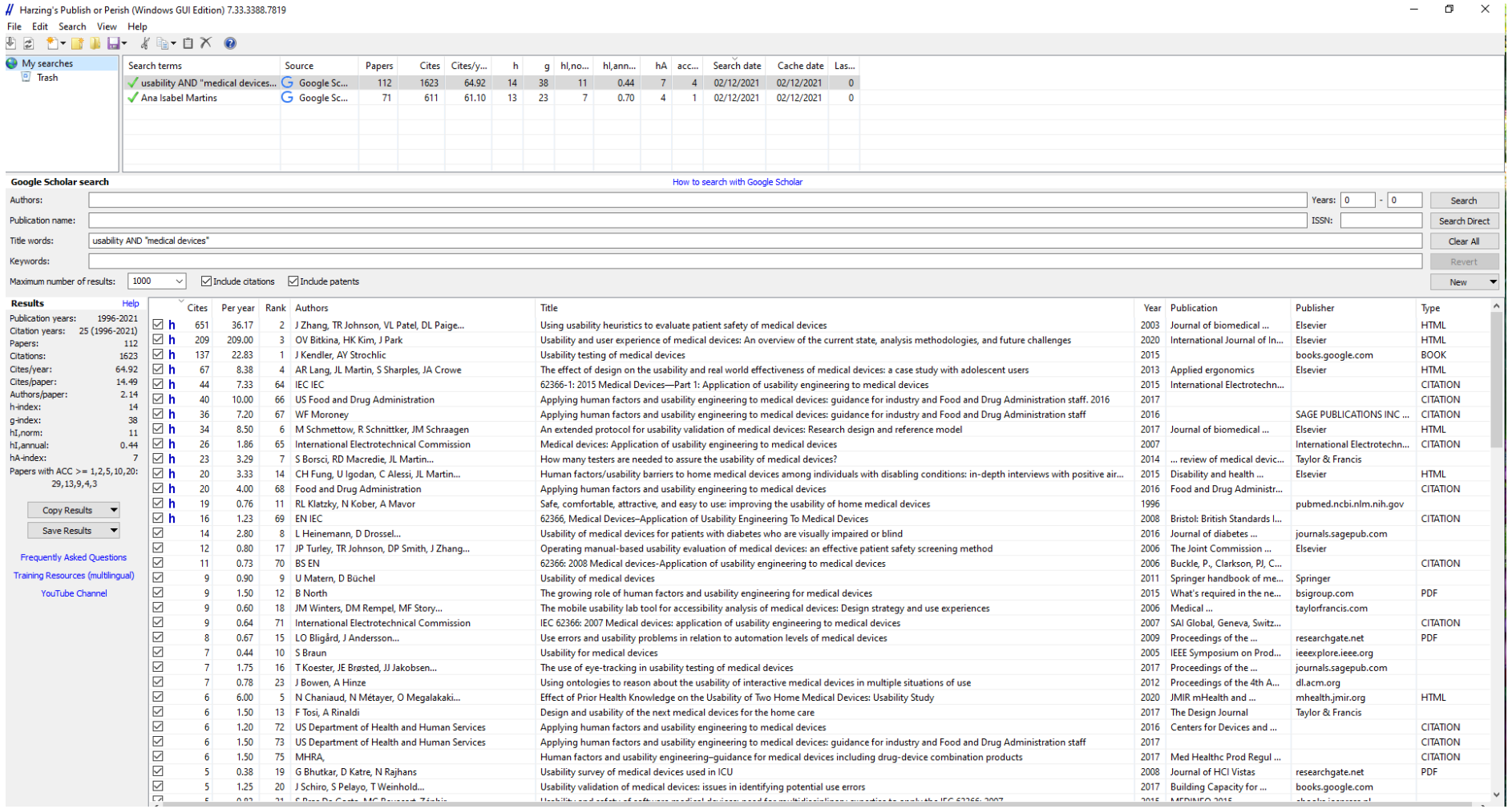
- It is important to correctly select the search terms

https://www.scopus.com/search/form.uri?display=basic#basic



2. LOCATE AND SELECT STUDIES

Publish or Perish



2.2. Search Strategies

The resources chosen for the review were three electronic databases (i.e., Scopus, Web of Science, and IEEE Xplorer). Boolean queries were prepared to include all the articles that have their titles, abstract or keywords conformed to the conjunction (i.e., AND Boolean operator) of the following expressions:

- "AAL", "ambient assisted living", "ambient assisted technology", "ambient assistive technology" or "ambient intelligence";
- "UX", "user experience", or "usability";
- "Evaluation" or "assessment".

The expressivity of the search procedure depends on the database. As an example, the query expression to retrieve articles from the Scopus database was de following: TITLE-ABS-KEY ((AAL or "ambient assisted living" or "ambient assisted technology" or "ambient assistive technology" or "ambient intelligence") and (UX or "user experience" or usability) and (evaluation or assessment)).

The following search terms were used: 'usability evaluation' or 'usability test' or 'usability testing' or 'user centered'. To limit the number of references, the search was restricted to the topic, which includes title, abstract, keywords and author fields.

Studies were sought using Web of Science Databases, because they index over 12,000 of the highest impact journals worldwide, including those of the Association for Computing Machinery - ACM Digital Library - and Institute of Electrical and Electronics Engineers - IEEE journals. The research was conducted on January 6, 2013.

The database search resulted in 2116 references, of those, 808 were excluded: 69 were duplicated, 171 did not have abstract and 568 were out of the research scope (Figure 1). All studies that use the term usability with a different meaning

2. LOCATE AND SELECT STUDIES

TIPS

- Run the final search within 24 hours
- Save search strategy in database as well as in .TXT file
- Last update search should be done within six months of submission for publication

- Citation management
- Exploiting to endnote, Mendeley, or other
- Organizing search results
- Deduplication with endnote

2.3. Inclusion and Exclusion Criteria

References were included if they reported on user-centered usability evaluation of AAL solutions that might be used to support older adults by promoting secure and supportive environments, optimizing healthcare provision, promoting healthy lifestyles, and facilitating social involvement and active participation in the society [6].

References were excluded if they (i) did not have abstracts, (ii) were not written in English, (iii) reported on reviews, surveys, or market studies, (iv) were books, reported on workshops, or special issues announcements, (v) reported on studies whose primary objectives were not usability assessment, or (vi) reported on studies that were not relevant for the objective of this systematic review.

2.4. Screening Procedures

The analysis and selection of the studies were performed in three steps:

- First step—the authors removed the duplicates, the articles without abstract and not written in English;
- Second step—the authors assessed all titles and abstracts for relevance and those clearly not meeting the inclusion and exclusion criteria were removed;
- Third step—the authors assessed the full text of the remaining articles against the outlined inclusion and exclusion criteria and the final list of the studies to be considered for the review was created.

Throughout this entire process, all articles were analyzed by three authors and any disagreement between the authors was discussed and resolved by consensus.

3. Results

3.1. Study Selection

Figure 1 presents the flowchart of the systematic review. A total of 5635 studies were retrieved from the initial search of the selected databases.

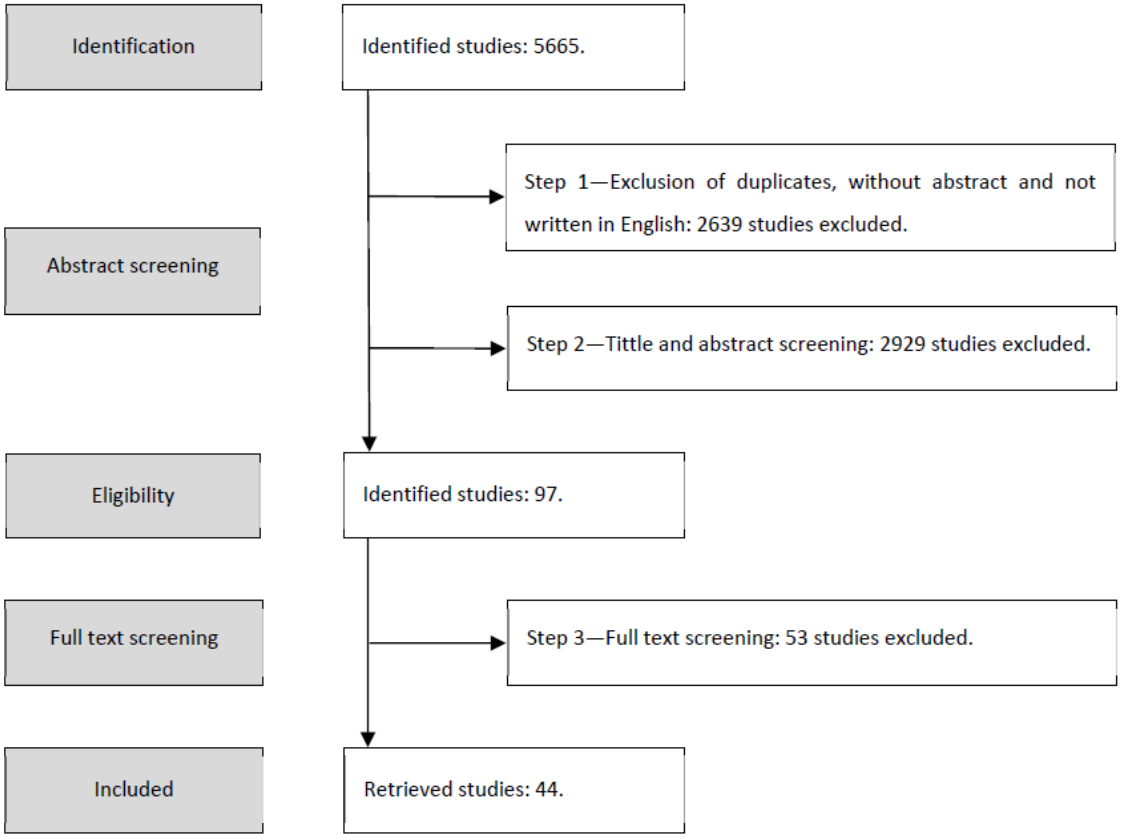


Figure 1. Systematic Reviews Flowchart.

3. EVALUATE THE SELECTED STUDIES

After selecting the relevant articles, it is necessary to assess their methodological quality.

2.6. Methodological Quality Assessment

Three authors independently assessed the methodological quality of included studies using a scale developed to assess the methodological quality of studies evaluating usability of electronic health products and services, the Critical Assessment of Usability Studies Scale (CAUSS) [30]. The CAUSS has 15 items that can be scored "yes" or "no". This scale is both valid and reliable (Intraclass Correlation Coefficient—ICC = 0.81) [30]. Each study was assessed by at least two authors. This quality assessment was undertaken in two steps: first three manuscripts were assessed by all the three authors involved in this step of the review to foster a common understanding of the scale items. Then, all the remaining manuscripts were independently assessed by two of the three authors. During both steps, disagreements were resolved by discussion and a final decision achieved by consensus. Percentage of agreement between the assessors was calculated for each one of the 15 items of the scale.

Did the study use valid measurement instruments of usability?
Did the study use reliable measurement instruments of usability?
Was there coherence between the procedures used to assess usability?
Did the study use procedures of assessment for usability that were adequate to the development stage of the product/service?
Did the study use procedures of assessment for usability adequate to study participants' characteristics?
Did the study employ triangulation of methods for the assessment of usability?
Was the type of analysis adequate to the study's aims and variables measurement scale?
Was usability assessed using both potential users and experts?
Were participants who assessed the product/service usability representative of the experts' population and/or of the potential user's population?
Was the investigator that conducted usability assessments adequately trained?
Was the investigator that conducted usability assessments external to the process of product/service development?
Was the usability assessment conducted in the real context or close to the real context where product/service is going to be used?
Was the number of participants used to assess usability adequate (whether potential users or experts)?
Were the tasks that serve as the base for the usability assessment representative of the functionalities of the product/service?
Was the usability assessment based on continuous and prolonged use of the product/service over time?

4. COLLECT THE DATA

A dataset is collected from each article (data collected depends on the purpose of the study):

2.5. Data Extraction

Concerning data extraction, the following information was registered in a data sheet prepared by the authors for each of the studies included in the review: (i) the demographics of the study (i.e., authors and respective affiliations, year and source of publication); (ii) the scope of the study; (iii) the purpose of the AAL solution being reported; (iv) details of the interaction technologies being used; (v) the methods, techniques, instruments and procedures applied to evaluate usability; (vi) the characteristics of the participants involved in the usability evaluation; and (vi) the outcomes being reported.

5. ANALYZE AND PRESENT THE RESULTS

The analysis of the results can be:

- Qualitative
- Quantitative (meta-analysis)

It is the statistical combination of the results of 2 or more studies.

The prisma guidelines are widely followed by the researchers.

It provides guidance on how to write a systematic review and comprises of flow diagram and at 27 item checklist

PRISMA
TRANSPARENT REPORTING OF SYSTEMATIC REVIEWS AND META-ANALYSES

5. ANALYZE AND PRESENT THE RESULTS

The presentation of results generally considers the following elements:

- A list of all positive and/or negative outcomes;
- The state of the art about a specific topic;
- Number of participants/solutions/technologies;
- Classification of the methodological quality of studies;
- Other pertinent comments.

3.2. Demographics of the Included Studies

Of the included 44 studies, some reported on the same research projects: studies [32,33], studies [45–47] and studies [36,52,58] were respectively related to the European funded projects ALADIN, iStoppFalls and Robot-ERA, while [68,74] were related to a project funded by the European Commission and co-funded by the Swiss Confederation.

In terms of publication types, ten studies were published in conference proceedings [31,32,34,35,38,40,42,61,62,72] and 34 studies were published in scientific journals [33,36,37,39,41,43–60,63–71,73,74].

Concerning the publication years, the included studies were published between 2008 (i.e., one study [31]) and 2020 (i.e., five studies [70–74]). The diagram in Figure 2 demonstrates a trend towards an increasing number of publications, and more than two-thirds of the studies (i.e., 30 studies [45–74]) were published in the last five years and more than one-third of the studies (i.e., 15 studies [60–74]) were published in the last two years.

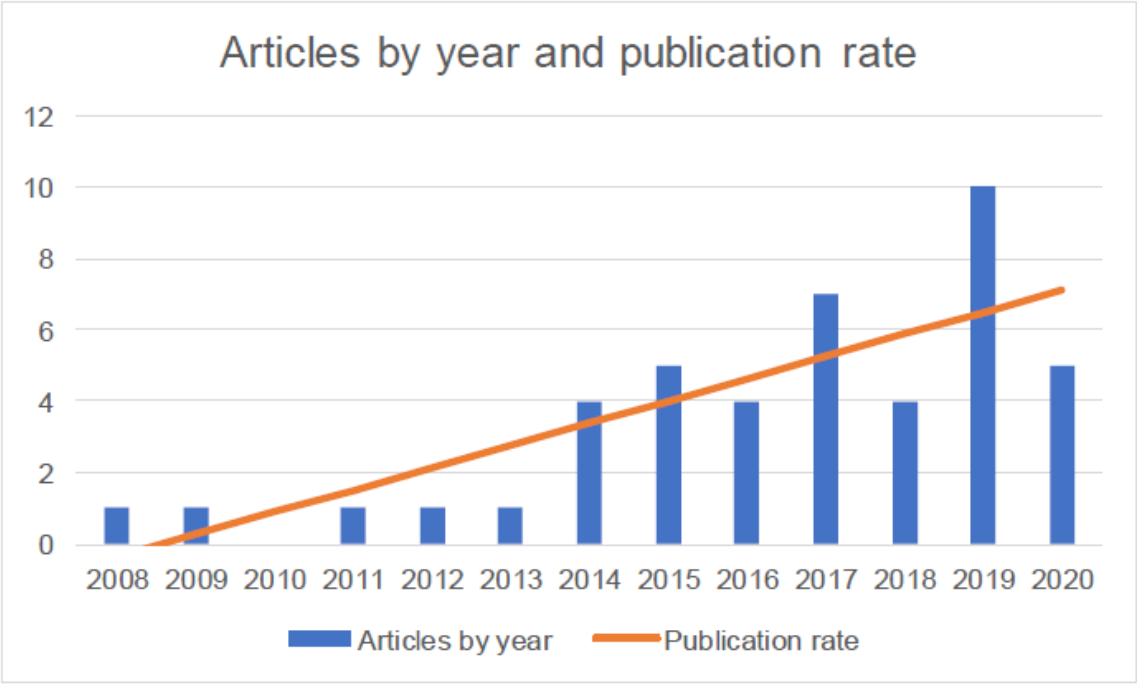


Figure 2. Studies by year and publication rate (calculated using RMS Least Square Fit).

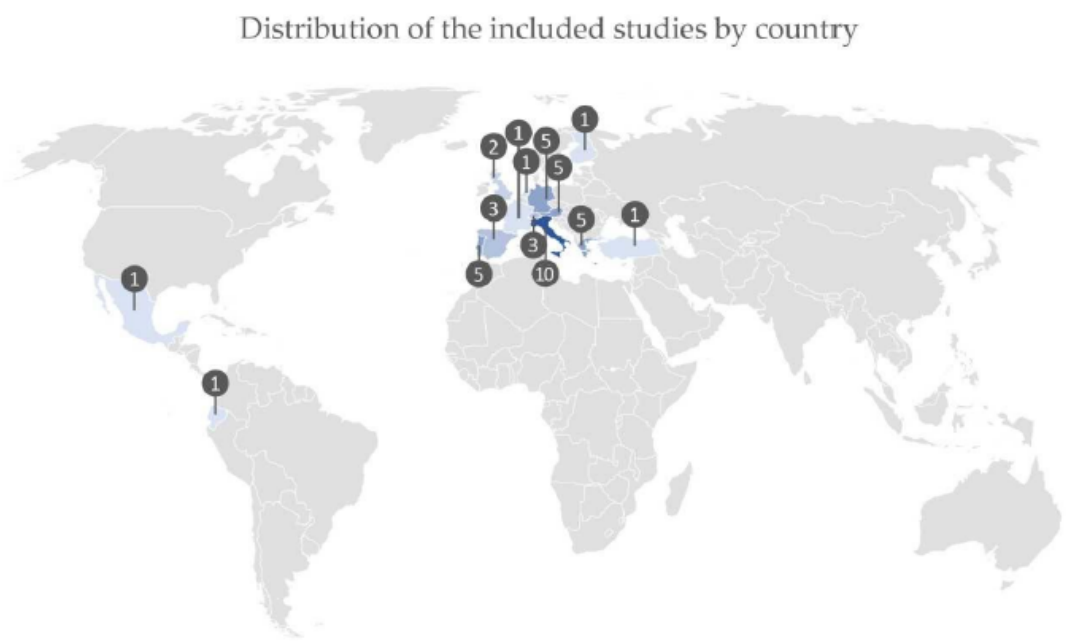


Figure 3. Distribution of the selected studies by country.

As can be seen in Table 1, 16 studies (i.e., 36% of the included studies) reported on the involvement of multinational research teams.

Table 1. Multinational teams.

References	Multinational Teams
[33]	Germany, United States of America, Italy, Austria, and Romain
[35]	Germany, Sweden, and France
[36]	Italy and Sweden
[37]	Finland and Spain
[39]	Spain and United Kingdom
[41]	Portugal and Spain
[47]	Austria, Australia, and Chile
[49]	Greece, Italy, and United Kingdom
[53,56]	Italy and Spain
[58]	United Kingdom, Italy, and Belgium
[63]	France and Greece
[64,68]	Switzerland and Sweden
[67]	Netherlands and Spain
[71]	Greece, Germany, Italy, and United Kingdom

Table 2. Domains and purposes of the AAL solutions reported by the included studies.

Domains	Purposes	References
Secure and supportive environment	Daily living activities	[31–34,36,38,39,42,49,57–60,69,71]
	Falls prevention	[45–48,66]
Healthcare provision	Home monitoring	[41,43,65,67,70]
	Telerehabilitation	[44,56,62,63]
	Remote care	[40,52,55]
	Medication management	[37,50]
Healthy lifestypes	Physical activity	[35,54,61,64,73]
	Cognitive activity	[72]
	Physical and cognitive activity	[68,74]
Social involvement and active participation	Social inclusion	[51]
	Participation in leisure activities	[53]

Table 3. Interaction modalities and respective terminal equipment.

Interaction	Terminal Equipment	References
Visual Interaction	Personal computer	[66]
	Mobile (i.e., tablet or smartphone)	[60,62,65,72]
	Mobile and personal computer	[41]
	Mobile and interactive TV	[54]
	Interactive TV	[32,33,40,49]
Visual and auditory interaction	Mobile	[37,51]
	Interactive TV	[53,55,70]
Visual and voice interaction	Mobile	[43]
Visual, voice and auditory interaction	Mobile	[42,50,67]
	Mobile and interactive TV	[39]
	Enhanced communication agents	[31,35]
Visual and gesture interaction	Personal computer and WiiMote	[44]
	Personal computer and Kinect	[61]
	Interactive TV and wearable inertial sensors	[68,74]
	Interactive TV, wearable inertial sensors and Kinect	[45–47]
	Interactive TV and Kinect	[73]
	Interactive TV and position sensors	[64]
	Personal computer, RGB cameras and depth sensors	[63]
Other interaction modalities	Immersive virtual reality	[56,69]
	Robots	[34,36,38,48,52,57–59,71]

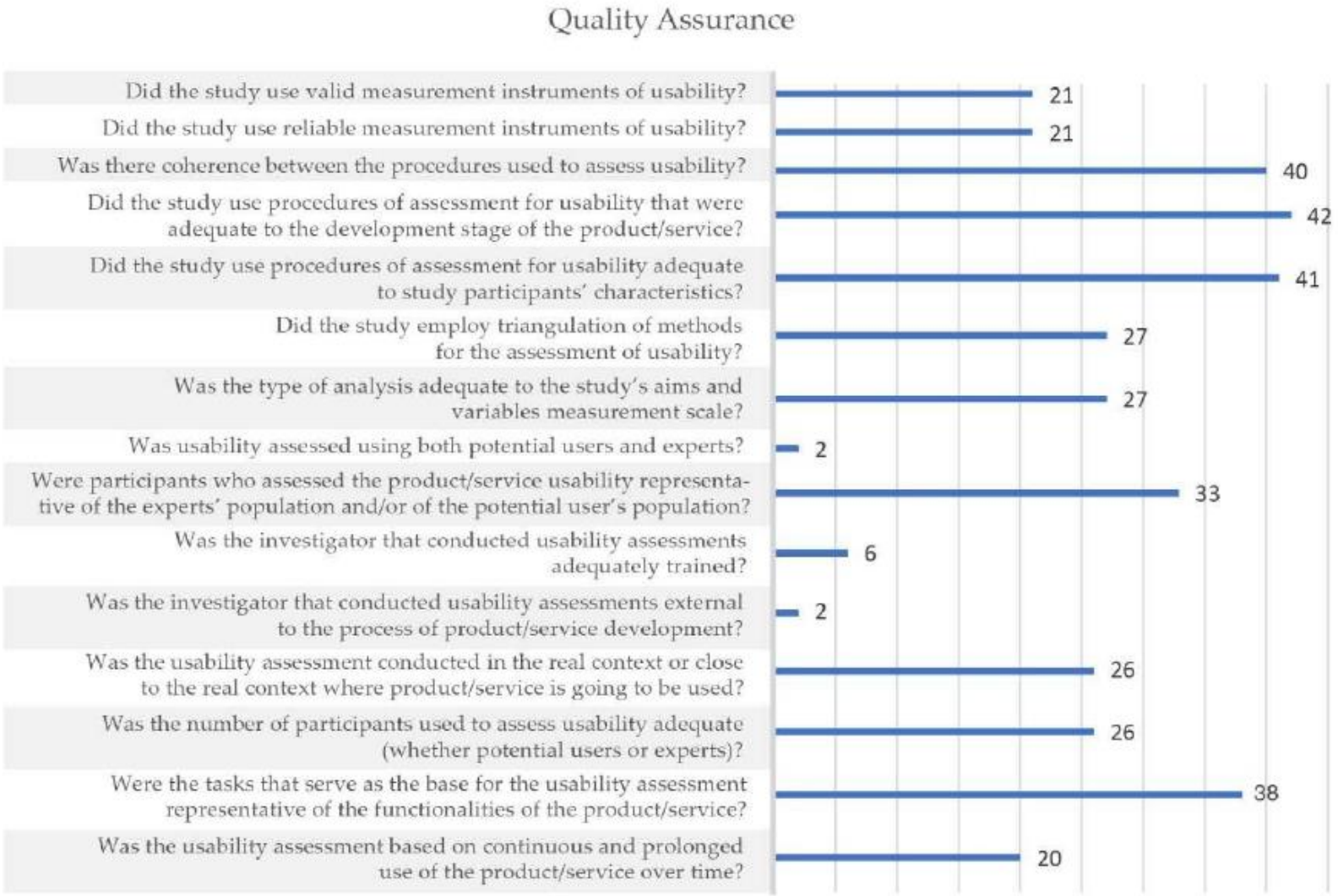


Figure 4. Number of studies that met each item, after consensus was reached between reviewers.

Table 4. Level of agreement between the reviewers for each item of CAUSS.

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Agreement	78%	78%	98%	93%	87%	80%	78%	83%	89%	85%	91%	87%	85%	96%	78%

Table 5. Usability assessment design.

#	Solution Being Evaluated	Test				Inquiry				Participants		Test Environment			
		P [1]	O [2]	T [3]	W [4]	I [5]	S [6]	Q [7]	C [8]	Number	Mean Age (Years)	I [9]	L [10]	P [11]	R [12]
[31]	Smart companion	-	-	-	x	-	-	-	-	10	82	x	-	-	-
[32]	Adaptive lighting application	-	x	-	-	-	-	-	-	12	- [13]	x	-	-	-
[33]	Adaptive lighting application	-	x	-	-	-	-	-	-	12	71	x	-	-	-
[34]	Social robot	-	-	x	-	-	-	x	-	16	77	-	x	-	-
[35]	Virtual physical training	-	-	-	-	x	-	x	-	30	69	x	-	-	-
[36]	Social robot	-	x	-	-	-	-	x	-	25	74	-	x	-	-
[37]	Medication management	-	x	-	-	x	-	-	-	4	80	x	-	-	-
[38]	Social robot	-	-	-	-	-	-	x	-	15	74	-	x	-	-
[39]	Smart Kitchen	-	x	-	-	-	-	x	-	63	- [13]	-	x	-	-
[40]	Remote care	-	x	-	-	-	-	-	-	30	58	x	-	-	-
[41]	Home monitoring	-	-	-	-	-	-	x	-	11	70	-	-	x	-
[42]	Smart companion	x	-	-	-	-	x	x	-	4	80	-	x	-	-
[43]	Home monitoring	x	x	x	-	-	x	x	-	25	76	-	-	x	-
[44]	Telerehabilitation	-	x	-	-	-	-	x	-	32	65	-	-	-	x
[45]	Falls prevention		x			x	x			153	73		x		
[46]	Falls prevention	-	-	-	-	x	-	-	-	12	73	-	-	x	-
[47]	Falls prevention	-	-	-	-	x	-	-	-	62	74	-	-	x	-
[48]	Falls prevention	-	-	-	-	x	-	-	-	14	- [13]	-	-	x	-
[49]	Social robot	-	-	-	-	x	x	x	-	7	79	-	-	x	-
[50]	Medication management	-	x	x	-	-	x	x	-	10	70	-	-	-	x
[51]	Application to promote social inclusion	x	-	-	-	x	-	x	-	22	66	-	-	x	-
[52]	Remote care	-	-	-	-	-	-	x	-	23	73	-	x	-	-
[53]	Leisure activities	x	-	-	-	-	-	x	-	20	70	-	-	x	-
[54]	Virtual physical training	-	-	-	-	-	x	-	x	14	73	-	x	-	-
[55]	Remote care	-	-	-	-	-	-	x	-	62	- [13]	-	-	x	-
[56]	Telerehabilitation	-	-	-	-	x	x	-	-	5	70	-	-	-	x
[57]	Social robot	-	-	-	-	-	-	x	-	17	75	-	x	-	-
[58]	Social robot	-	-	-	-	-	x	x	-	82	78	-	x	-	-
[59]	Social robot	-	-	-	-	-	x	-	-	25	37	-	-	-	x
[60]	Safety application	-	-	-	-	-	-	x	-	44	- [13]	-	x	-	-
[61]	Virtual Physical training	x	-	-	-	x	x	-	-	12	73	-	-	-	x
[62]	Telerehabilitation	x	x	-	–	-	-	-	-	4	72	-	-	-	x
[63]	Telerehabilitation	-	-	-	-	x	-	x	-	6	80	x	-	-	-
[64]	Virtual physical training	x	-	x	-	-	x	-	-	12	72	x	-	-	-
[65]	Home monitoring	x	-	-	-	-	x	x		10	80	x	-	-	-
[66]	Falls prevention application	x	-	x	-	x	x	-	-	15	- [13]	-	-	-	x
[67]	Home monitoring	-	-	-	-	-	x	x	-	26	- [13]	-	-	x	-
[68]	Virtual physical and cognitive training	x	x	x	-	-	x	x	-	21	74	-	-	x	-
[69]	Support to daily tasks	-	-	-	-	x	x	-	-	6	60	-	-	-	x
[70]	Home monitoring	-	-	-	-	-	x	-	-	19	73	-	-	x	-
[71]	Robot	x	-	-	-	-	x	-	-	104	74	x	-	-	-
[72]	Cognitive game	-	-	-	-	-	-	x	-	63	- [13]	x	-	-	-
[73]	Virtual physical training	x	-	-	-	-	-	x	-	135	46		x	-	-
[74]	Virtual physical and cognitive training		x	x			x	x		21	71				x

Notes: x reported; - not reported; Test method ([1] Performance; [2] Observation; [3] Think aloud; [4] Wizard of Oz); Inquiry method ([5] Interviews; [6] Scales; [7] Questionnaires; [8] Card sorting); Test environment ([9] Institutional site; [10] Living lab; [11] Participant home; [12] Research lab); Participants ([13] Mean age of the participants not reported).

Table 6. Usability evaluation methods.

Methods	Studies
Exclusively test methods	[31–33,40,62]
Exclusively inquiry methods	[35,38,41,47–49,52,54–60,63,67,69,70,72]
Multimethod (test and inquiry methods)	[34,36,37,39,42–46,50,51,53,61,64–66,68,71,73,74]

Table 7. Usability evaluation instruments.

Instruments Nature	Study
Validated scales and questionnaires	[34,42,43,45,50,54,56,58,59,61,64–71,74]
Ad-hoc scales and questionnaires	[35,36,38,39,41,49,52,53,55,60,63,73]
Scales and questionnaires based on technology acceptance models	[44,51,57,72]

Table 8. Environments where the usability evaluations were conducted.

Test Environment	Studies
Participant's home	[41,43,46–49,51,53,55,64,67,68,70]
Institutional site as day care or nursing home	[31–33,35,37,40,63,65,71,72]
Living lab	[34,36,38,39,42,45,52,54,57,58,60,73]
Research lab	[44,50,56,59,61,62,66,69,74]

6. INTERPRET THE RESULTS

Discussion

- Benefits vs. cons
- Quality of studies
- Bias in the review process
- Agreement or disagreement with other existing revisions

Conclusion

- Implications for practice
- Implications for the investigation

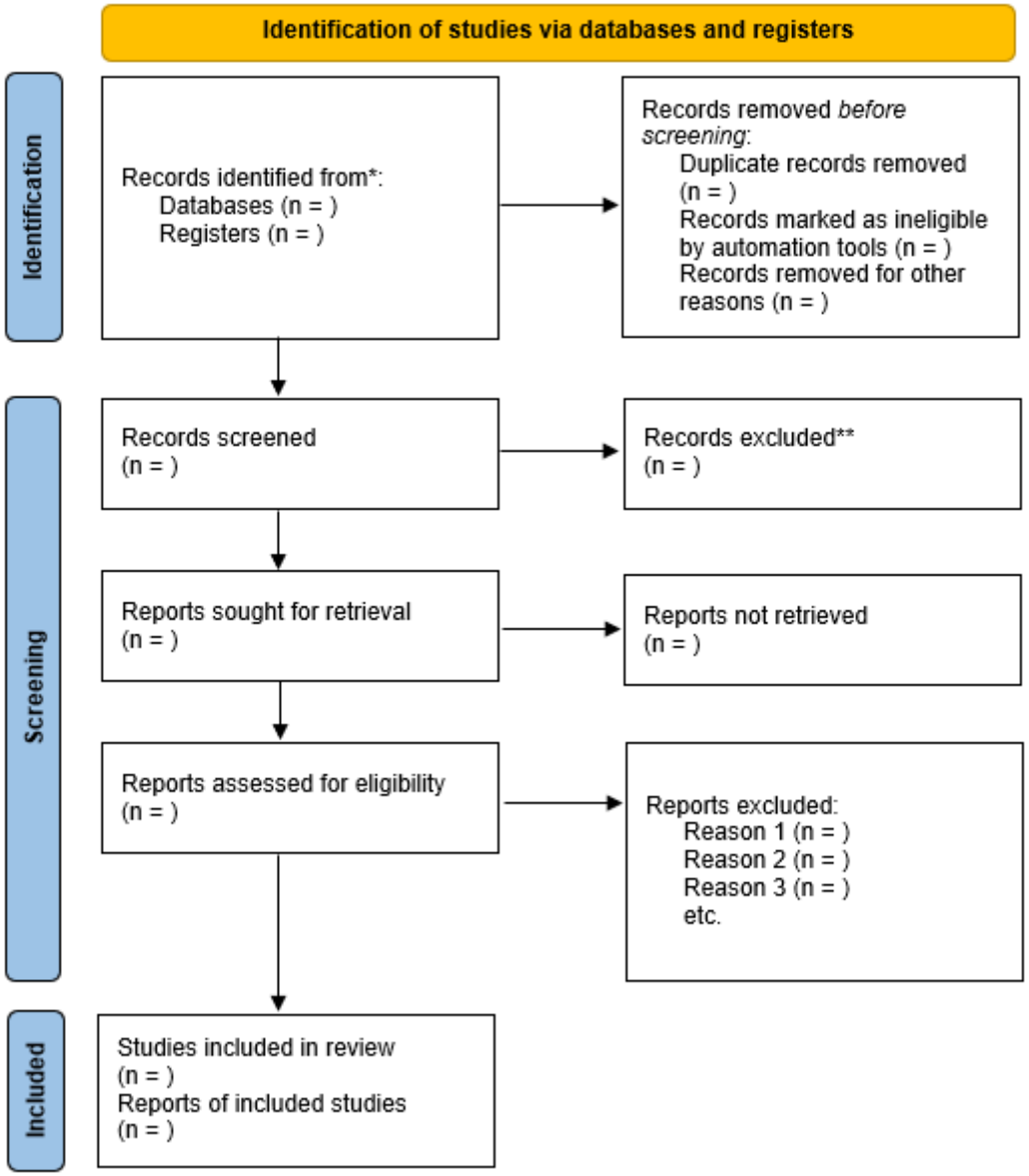
STRUCTURE OF THE SYSTEMATIC REVIEW

- Abstract
- Introduction
- Methods (research questions, search strategy, study selection, study quality assessment checklists and procedures and data extraction strategy)
- Results (flow diagram and the main results including quality assessment results)
- Discussion
- Conclusion

IMPORTANT RESOURCES

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	



- http://www.prisma-statement.org/

Thank you

Questions?

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