PARTICIPANT HANDOUT · MMS3 TALK

Beyond the Summary

How to Plan, Structure, and Place a High-Impact Review Article

For early-career researchers in engineering and applied science writing their first review · Assoc. Prof. Dr. Soorathep Kheawhom, Department of Chemical Engineering, Chulalongkorn University

The paradox this session addresses. Review articles receive on average **2.95×** the citations of original research papers (range 1.34× to 6.74× by field). Yet in one documented sample of 538 reviews, only **21%** had passed ten citations two years after publication. Both facts are true. Writing a review is not a strategy; writing the right review at the right moment is.

1. The genre map: what kind of review are you writing?

"Review" is a journal format label. The methodological type is a separate decision, and it comes first.

The SALSA framework (Grant & Booth, 2009) defines every review type by four dials: **S**earch (how much did you look for, and can it be repeated?), **A**ppraisa**L** (did you judge quality, or accept every paper equally?), **S**ynthesis (how were studies brought together?), **A**nalysis (what new understanding did you produce?).

Type	Defining feature	Search / appraisal load	Write one when...
Narrative	No protocol. Expert selection. Argument-led.	Low. Not reproducible by design.	You are framing a new research programme or a thesis chapter.
Systematic	Protocol first, exhaustive documented search, dual screening, formal appraisal.	Very high. 6–12 months, two or more people.	The question is bounded: does X outperform Y under condition Z?
Scoping	Maps extent, range and nature of the evidence. Appraisal usually omitted. Uses PCC, not PICO.	High search, low appraisal.	You want to find the gaps before committing to a systematic review.
Mapping	Charts and categorises a body of work, often with a database output.	High search, no synthesis of effect.	The field is large and disordered and needs a shared classification.
Meta-analysis	Systematic review plus statistical pooling of effect sizes.	Highest. Needs commensurable outcome metrics.	Test protocols are standardised enough to compare numerically.
Critical	Explicitly evaluative. Goal is a conceptual contribution: a model, a taxonomy, a reframing.	Selective but justified. Appraisal is the point.	You have a thesis about the field that other experts would argue with.
State-of-the-art	Time-bounded. What is known now, usually the last 5–10 years.	Moderate. Recent-window coverage must be complete.	A field has moved fast enough that the last review is out of date.
Tutorial	Pedagogic. Written for newcomers, not for specialists.	Selective. Clarity outranks completeness.	A technique is being widely misapplied because nobody explains it well.
Perspective / Opinion	Signed argument. Short. Explicitly personal.	Minimal. Authority carries the piece.	You are already established and want to move the agenda. Usually invited.
Umbrella	The unit of analysis is the existing review, not the primary study.	Moderate, plus appraisal of reviews (AMSTAR 2).	The topic already has many reviews that disagree with each other.

One topic, four completely different papers

Same literature, same author. The type is a decision about which question you are answering, not about how hard you are willing to work.

Type	A plausible title	The question it answers	What it costs
Narrative	*"Artificial Interphases for Aqueous Zinc Anodes: Progress and Prospects"*	What has the field been doing?	3–4 months, ~120 refs, one author
Scoping	*"Mapping the Evidence for Artificial Interphases on Zinc Anodes: What Is Measured, and What Is Not"*	What evidence exists, and where are the holes?	5–6 months, documented search, two screeners
Critical	*"Cycling Stability of Coated Zinc Anodes Is Set by Test Conditions, Not by Coating Chemistry"*	Is the field's central claim actually supported?	6–9 months, ~90 refs, a thesis and a tier scheme
Systematic + meta	*"Do Artificial Interphases Extend Zinc Anode Life? A Systematic Review and Conditional Meta-Analysis"*	How large is the effect, and under which conditions?	9–12 months, protocol first, two or more people

None of these is more advanced than the others. They answer different questions and they fail in different ways. Notice that the title announces the type before the reader opens the paper, and that only the critical title is one a reader could disagree with.

Three things that get taught wrong

The claim you will hear	Why it is wrong
"A systematic review is better than a critical review."	Systematic describes how the evidence was found and selected. It buys transparency and reproducibility. It does not buy insight, and on its own it produces nothing the field did not already know.
"Meta-analysis is the highest level of review."	Meta-analysis is a statistical step used *inside* a systematic review when the outcomes are commensurable. It is not a rung above anything. In materials work a pooled number can be statistically precise and physically meaningless.
"A critical review is just an unsystematic review."	The value of a critical review is the reasoning: testing assumptions, locating contradictions, separating correlation from mechanism, and building a framework that reconciles evidence others reported as conflicting.

Two axes, not a ladder

HIGHER CRITICAL SYNTHESIS ↑

Critical review Insight, no documented search	**Systematic critical review** Documented search, then real synthesis. The strongest combination available to a junior author.
Narrative review Expert commentary, no protocol	**Descriptive systematic review** Rigorous search, thin synthesis

← LOWER SYSTEMATIC RIGOUR HIGHER SYSTEMATIC RIGOUR →

Where does meta-analysis go? Nowhere on this map. It attaches to the right-hand column when, and only when, the reported outcomes are commensurable. Adding it does not move a review upward; it sharpens a quantitative claim the documented search already made possible.

The bottom right is not a failure. A scoping or mapping review belongs there by design. It becomes a failure only when critical synthesis was promised and never delivered.

Do not import the clinical evidence hierarchy

	Clinical / medical research	Materials / engineering research
The typical question	"Does treatment A improve outcome B compared with C?"	"Why does this system behave this way, when does it work, and when does it fail?"
What varies between studies	Population and dose, inside a largely shared protocol	Loading, current density, cell format, electrolyte, cut-off criterion. Effectively everything.
The unit compared	A pre-defined clinical outcome	A performance number whose test conditions differ study by study
What synthesis produces	A narrower uncertainty around an effect	A mechanism that explains why the reported results diverge
Is pooling usually meaningful?	Often yes	Sometimes. Often the pooled number is precise and physically meaningless.
What rigour looks like	PRISMA, protocol registration, risk-of-bias tools	A documented search plus an evidence-grading scheme you define for your own field

The right review methodology is set by the scientific question, not by a hierarchy borrowed from another discipline.

In medicine the central question is often "does it work?". In engineering we usually have to ask "why does it work, when does it work, and when does it fail?". A worked example: pooling a hundred zinc-anode coating papers might yield "coated zinc lasts 2.4× longer". That number is close to meaningless, because the studies differ in zinc thickness, electrolyte, current density, areal capacity, depth of discharge, separator and failure criterion. Sorting the same hundred papers by utilisation, current density and areal capacity, and finding that the ultralong-cycling claims cluster in mild test conditions, is a finding. The pooled number was not.

So which one should you write?

Question	Answer	What that means
1. Can you state a claim about your field that an expert would argue with?	**No, not yet**	Go to question 2. This is the normal starting position and not a failure.
	Yes	Go to question 3.
2. Is your goal to map what exists and find the gaps?	**Yes**	**Scoping or mapping review.** The right first review. Defensible, useful, and it tells you whether a critical review is possible later.
	No	**Narrative review.** Fine as a thesis chapter or grant background. Think hard before submitting it as a paper.
3. Are the outcomes comparable enough to pool or normalise?	**No**	**Critical review.** Add a documented search and it becomes a systematic critical review: the top-right quadrant.
	Yes	**Systematic review.** Add a meta-analysis only if pooling survives scrutiny. Otherwise report subgroups honestly.

Three questions, four honest answers. Notice that none of them is "write the most comprehensive review you can".

Realistic targets for a first review, with a senior co-author: a **scoping review**, a **critical review**, or a **tutorial review**. Do not attempt a comprehensive systematic review of a large field alone.

2. What a review does to your academic profile

What it genuinely buys you

- **Agenda setting.** You decide which papers become the canon of your subfield. This is the largest and least-discussed benefit.
- **A research identity.** A review is where you name and defend the framework your group works under.
- **Invitation flow.** Editors commission people who have already written well on the topic. The first review is what makes the second one an invitation.
- **Reusable infrastructure.** Grant proposal backgrounds, a course module, and the fastest way to onboard a new student.
- **Low-risk collaboration.** A multi-institution review often precedes a joint experimental project.

What it will not do

- **It does not substitute for primary research.** A record heavy on reviews and thin on experimental papers reads as a group without a working laboratory.
- **It does not confer expertise you lack.** Referees notice reviews assembled from abstracts, and abstract-only reading propagates other people's errors under your name.
- **It is not faster than a research paper.** Six to twelve months, 100+ references, plus revision rounds.

The ethical ledger

Reviews do not create citations from nothing; they concentrate attention. In an analysis of ~6 million articles, about 70% of papers covered by a review subsequently lost citations, with a median reduction of 38%. Practical rule: **cite the specific primary paper for a specific claim; cite the review only for context.**

The normal configuration for early-career authors: junior first author, senior sponsor. A study of 1,102 reviews found junior researchers were the predominant authors and served mainly as first authors.

3. Novelty and contribution: what are you actually adding?

In a research paper the novelty is the data. In a review the novelty is the structure you impose on data that already exists. A review is an act of construction, not of collection.

The contribution ladder

Every rung is still called a review. Only the lower half of this list is a contribution.

1. Collection	*"What papers exist on this topic?"*
2. Classification	*"How can they be grouped?"*
3. Comparison	*"How do they differ from one another?"*
4. Synthesis	*"What does the evidence collectively say?"*
5. Critique	*"What is unreliable, inconsistent or missing?"*
6. Reconciliation	*"Why do these studies appear to disagree?"*
7. Framework or mechanism	*"Can one concept account for all of it?"*
8. Design rules and hypotheses	*"What should we build or test next?"*

The referee's test. Remove the reference list. What intellectual contribution from the authors is left? A review with 500 references can sit on rung 1. A critical review with 80 can sit on rung 8.

Contribution type	What it looks like	Concrete example
A taxonomy or framework	You name the categories the field then uses to talk about itself, and organise the whole review under them.	A coordination–transport–interface lens applied consistently across otherwise unrelated material families.
An evidence standard	You define how claims in this field should be graded, then re-score the published corpus against it.	A Tier 0–3 durability standard for electrode materials, with every included study assigned a tier.
A reconciliation	You explain why two bodies of literature that appear to contradict each other are both right under stated conditions.	Showing that conflicting cycle-life reports separate cleanly by depth of discharge and cell format.
A quantitative synthesis	You normalise incomparable reported conditions into a single comparable dataset, then analyse it.	Converting a narrative review into an applied meta-analysis across 27 primary studies by normalising loading, C-rate and temperature.
A negative finding about the field	You show that a widely believed claim rests on very thin evidence, and quantify how thin.	Demonstrating that a headline performance metric traces to a handful of unreplicated Tier 1 measurements.
A translation	You connect two communities that work on the same problem and rarely cite each other.	Mapping electrochemistry vocabulary onto process-systems vocabulary so that both literatures become searchable to each other.

Not a contribution

A newer time window on its own · more references than the last review · a different material system · a bibliometric map with no question behind it · a comprehensive summary of everything published.

"We cover 2021–2026 whereas the last review stopped at 2021" is an update, not a contribution, and referees will say so.

The naming test

If your contribution cannot be given a name that another author could put into their own paper, it is not a contribution yet.

Named things get reused; reuse is citation. Before submitting, write your contribution as a two- or three-word noun phrase. If you cannot, go back to the framework section.

Sources: Grant & Booth, *Health Info. Libr. J.* **26**, 91 (2009) · Sutton et al., *ibid.* **36**, 202 (2019) · Miranda & García-Carpintero, *J. Informetr.* **12**, 1015 (2018) · Ketcham & Crawford, *Lab. Invest.* **87**, 1174 (2007) · McMahan & McFarland, *Am. Sociol. Rev.* **86**, 341 (2021) · Chang & Wu, *Scientometrics* **130**, 4995 (2025).

4. Go / No-Go: five gates before you commit

If your topic fails any one gate, the correct decision is to wait, to narrow, or to write something else.

Gate 1 · Field maturity

30+ relevant primary papers in the last 2–3 years means the topic is timely

15–20 relevant papers within the last 5 years is the absolute minimum

< 50 significant papers overall and the topic is probably too immature

> 120 and your scope is too broad. Narrow it, or split the paper

Gate 2 · Review saturation

The editorial rule at *Chemical Reviews*: the topic must not have been comprehensively reviewed in the past **3 to 4 years**. Every RSC proposal form carries a mandatory field asking you to comment on other reviews on a similar topic and justify why there is room for another.

Run the review search before the primary search. In Scopus: your topic terms `AND DOCTYPE(re) AND PUBYEAR > 2020`. Then repeat with `DOCTYPE(ar)` for the last three years. Those two counts give you Gate 1 and Gate 2 in fifteen minutes.

If good reviews already exist you have three legitimate moves: **(a)** critique their approach and limitations, **(b)** take an angle they did not cover, **(c)** foreground what has been published since.

Gate 3 · Standing

Do you have primary research papers on this topic from the last three years? RSC and ACS proposal forms require them by DOI. If not, your route is a co-authored review with someone who has them.

Gate 4 · A thesis

Can you state, in one sentence, a claim an expert would argue with?

Not a thesis: "Advances in X."

A thesis: "The reported cycle-life gains in X are an artefact of test protocol, not of materials chemistry."

Gate 5 · Capacity

Six to twelve months, a co-author, and a student who will not be derailed. A review is a project, not a gap-filler between experiments. Assign roles and set internal deadlines before you start.

5. The process: eight steps

#	Step	What it actually involves
1	**Scope**	Define the question using **PCC** (Population, Concept, Context) rather than the clinical PICO. Write down what is *excluded* as well as what is included, and the years you will cover.
2	**Gap analysis**	Build the **prior-review comparison table** (Worksheet A, at the back). One row per existing review; columns for window, organising logic, what it does not do, and what you add. If the last column is empty, do not write the paper.
3	**Proposal**	Two to five pages to the editor *before* writing the manuscript. Requirements below.
4	**Search**	Scopus and Web of Science as primary systems; Engineering Village (Compendex + Inspec) for controlled vocabulary; Google Scholar as a supplement only, never as the principal system. Validate against a seed set of 10–30 papers you already know must be included. Add forward and backward citation chasing as a separate arm. Include grey literature: standards (ASTM, IEC, IEEE), patents, national-laboratory reports, preprints.
5	**Screen & extract**	Two screeners against a written inclusion rule. Rayyan (free), Covidence (paid, end-to-end), ASReview (free, active learning). **Design the extraction template from your framework before you open the first PDF.**
6	**Appraise**	Grade the evidence. Almost no engineering review does this, which makes it the cheapest available way to be distinctive. See the evidence-tier scheme in section 7.
7	**Synthesise**	Build a **concept matrix**: concepts as rows, studies as columns. Every body paragraph is one row. A row with one entry is not yet a concept; a column in no row is a paper that does not belong.
8	**Write**	Figures and tables first, then the prose around them.

6. What editors require in a proposal

Chemical Reviews (ACS) · maximum 5 pages

- Title, authors and affiliations
- A detailed topical outline of 2 to 3 pages
- A list of previous reviews on the subject
- Five closely related papers by the authors
- Estimated reference count and page count
- Tentative submission date
- At least five suggested expert referees

Manuscripts submitted without an invitation or an approved proposal are not considered. Decision usually within two months.

RSC journals · under 2 pages

- Proposed title, authors, and submission date
- Why the field matters now, and its implications for the wider community
- Comments on other reviews on a similar topic, justifying why there is room for another
- Section outline with ten or more core references, with titles and DOIs
- A CV of three pages or less, or a research webpage, highlighting your reviews and your last-three-years papers

Acceptance of a proposal does not guarantee publication; full peer review still applies.

Formats and routes in, by venue

Check the current author guidelines before writing a word. These limits change, and exceeding one is a desk-rejection trigger at several of these journals.

Venue	Formats offered	Size and shape constraints	Route in
Chemical Reviews (ACS)	Review; Focus Review	Focus Review ~20 published pages	Proposal mandatory (max 5 pages). No invitation or approved proposal, no consideration.
Chem Soc Rev (RSC)	Review; Tutorial Review; Viewpoint	Review to 45 pages; Tutorial to 15 pages plus a Key Learning Points box	Proposal form; proposals welcomed
Energy & Environ. Sci. (RSC)	Review; Perspective; Minireview	Review 10,000+ words; Perspective 5,000–10,000; Minireview to 3,000	Proposal form; 10+ core refs with DOIs; your last-3-years papers
Green Chemistry (RSC)	Critical Review; Tutorial Review; Perspective	A Critical Review may include the authors' own unpublished work	Contact the editor before starting
Nanoscale Horizons (RSC)	Review; Minireview; Focus	Review 6–8 printed pages; Minireview ~3 pages	Usually commissioned; timely direct submissions welcomed
Nature Reviews Materials	Review; Perspective; Roadmap; Comment	~25 refs per 1,000 words; max 7 display items	Synopsis proposal for Reviews; mostly editor-initiated
Renew. Sustain. Energy Rev.	Review	Purely bibliographic and single-country reviews are excluded	Open submission; a real critique element is required

Verify the current author guidelines of your target journal before writing. Format limits change, and exceeding a stated limit is a desk-rejection trigger at several major venues.

7. Appraisal: turning a list into a review

A worked example: evidence tiers

Tier 0	Claim asserted; conditions not reported
Tier 1	Single measurement, idealised conditions
Tier 2	Replicated, conditions fully reported
Tier 3	Independently reproduced under a stated protocol

Publish the tier assignment for every included study. That table becomes the artefact other authors reuse, and reuse is citation. Do not exclude low-tier studies silently: score them, report them, and say what you did with them.

Clinical appraisal logic, translated to engineering

- **Risk of bias** — uncontrolled test conditions; author-run comparisons against untuned baselines; missing calibration or uncertainty budget.
- **Indirectness** — coin cell versus pouch; lab coupon versus field component; simulated versus measured; idealised versus service loads.
- **Imprecision** — n = 1, no replicates, no error bars.
- **Publication bias** — the record-efficiency ratchet: only improvements are ever published; failed formulations are invisible.

Adapted from the GRADE downgrade domains. Borrow the logic, drop the clinical vocabulary.

8. Structure of the finished article

Section	What it must do
Title	Descriptive and specific. Avoid "advances in" and "emerging". It should carry the framework, not just the topic.
Abstract	A miniature of the whole review, not an introduction to the topic. It must state the main conclusions. The last sentence should be your thesis.
Introduction	Problem, gap, hook. State the scope explicitly, including the years of literature covered. Place the prior-review comparison table here.
Framework	Your taxonomy, tier scheme or conceptual model, defined in its own numbered section *before* it is used. **This is the contribution.**
Body	Organised by the framework — never by chronology, never by author. One concept per section, several papers per paragraph, a verdict at the end of each.
Cross-cutting	Issues that cut across all categories: standards, datasets, scale-up, safety, cost, reproducibility.
Challenges & outlook	Three to five *named* challenges, each with a specific actionable milestone: which experiment, by whom, measuring what, and what result would settle the question.
Conclusion	Short. What the field should now believe that it did not believe before reading this.

The title is the first test of whether you have a thesis

Could sit on any review of the topic	Could only sit on yours
"Recent Advances in Zinc-Ion Battery Cathodes"	**"Why Capacity Fade in Zinc-Ion Cathodes Is a Dissolution Problem, Not a Structural One"**
"A Review of Machine Learning for Materials Discovery"	**"Machine Learning for Materials Discovery: Five Benchmarks That Do Not Test Generalisation"**
"Progress and Perspectives on Solid Electrolytes"	**"Reported Critical Current Densities in Solid Electrolytes: A Tier-Based Reassessment"**

A title that would fit on any review of the topic is not a title yet. The words *advances*, *progress*, *perspectives*, *recent*, *emerging* are placeholders: every one can be deleted with no loss of information. A review title has one job, which is to state the claim or to name the framework. Write it last, after the framework section exists, and check that it agrees with the final sentence of the abstract.

Four ways to organise the body — pick one, and say so in the introduction

- **Function-centric** — by what the work does: synthesis, characterisation, modelling, deployment.
- **System-oriented** — by layer: electrode, electrolyte, interface, cell, pack, system.
- **Application-driven** — by end use: grid storage, transport, portable, off-grid.
- **Framework-based** — you propose a conceptual framework and organise everything under it. Highest risk, highest reward.

Mutual-exclusivity test: could a reader who has seen only your section headings predict which section any given paper belongs in? If not, the taxonomy is not finished.

Budgets and the three tables that get you cited

~25	references per 1,000 words
max 7	display items in a *Nature Reviews*-style Review
100–120	references for a comprehensive engineering survey
3–5	named challenges in the outlook

1. The prior-review table — what existed, what it missed, what you add. Editors read it first.
2. The evidence table — every included study, its conditions and its tier. The artefact others reuse.
3. The gap table — what is not known, why, and what experiment would settle it.

Original display items are preferred everywhere. A few venues discourage large tables in favour of graphical summaries — check your target.

9. Seven ways reviews get rejected

The laundry list	One paragraph per paper, joined by "subsequently" and "meanwhile". Fixed by the concept matrix.
No thesis	The reader finishes and cannot say what the authors think.
Undefined scope	No statement of what is included, excluded, or what years are covered.
Cherry-picked evidence	No selection criteria, so the reader cannot tell what was left out or why. Fixed by reporting the search.
Self-citation bloat	The authors' own work singled out for emphasis. Referees always notice. In a multi-author team, have each co-author's own work assessed by a different co-author.
Stale coverage	The most recent references are two years old, or a newer review already exists.
Generic outlook	"Further research is needed." This sentence has never helped anyone.

10. AI tools: where they legitimately help

Match the tool to the stage. Every row has a hard boundary. The point is not abstinence, it is a use you can describe to an editor and defend to a referee.

Stage	Tools	What it may do	Hard boundary
Scoping and gap finding	Connected Papers, ResearchRabbit, Litmaps, Undermind	Surface clusters and adjacent work your Boolean string missed	Never report them as a search arm. Their graphs shift as the index updates, so they are not reproducible.
Search string building	litsearchr (R); an LLM for synonyms, spellings and legacy terms	Propose candidate terms and variants you had not thought of	Never skip the seed-set recall check afterwards. Term suggestions are hypotheses, not coverage.
Screening	ASReview (active learning), Rayyan ranking, an LLM pre-filter	Rank records so likely-relevant ones come first, or act as a declared second screener	Never the sole screener, and prioritisation is not exclusion. Every human–machine disagreement is adjudicated by a person, and the stopping rule is stated.
Data extraction	Elicit, Covidence extraction suggestions	Pre-fill factual fields: method, sample size, year, country, setting	Never trust it on interpretive fields. In a 2025 evaluation, AI extraction reached ~81% accuracy against ~87% for humans on factual fields, but agreement fell to ~16% on constructs of interest and ~35% on main results.
Claim checking	Scite citation statements and retraction flags	Show whether a claim is supported or contested elsewhere, and flag retracted sources	Never accept the classification without reading the source. Coverage depends on publisher agreements.
Language	Any general LLM	Improve the clarity of sentences you wrote yourself	Never generate synthesis prose, and never generate citations. Both are detectable and both are career-damaging.

The three-line ethical test, before you submit

1. Provenance. Can you point to the primary source for every claim and every number, because you read it?

2. Accountability. Would you defend every sentence in a referee report as your own?

3. Disclosure. Are the tool, the model and version, the date, and the exact stage written into the manuscript?

Two hard prohibitions

Never paste a manuscript you are refereeing into a public AI tool. That is a confidentiality breach at every publisher listed below.

Never submit a citation you have not opened yourself. A fabricated or misattributed reference is trivially detectable and is the fastest way to lose an editor's trust permanently.

Model disclosure statement — adapt and paste

"During the preparation of this work the authors used [tool, model and version] on [date range] to [specific stage: e.g. generate candidate search synonyms; rank records for title-and-abstract screening; pre-fill factual data-extraction fields; improve the readability of author-written text]. All records were adjudicated by the authors, all extracted values were verified against the primary sources, and all references were checked against the original publications. The authors reviewed and edited the content and take full responsibility for the content of the publication."

What the publishers require (2025–2026)

Universal across ACS, RSC, Elsevier, Springer Nature, Wiley, IEEE, ICMJE and COPE: AI cannot be an author; authors remain fully accountable for every sentence and citation; referees must not upload manuscripts to public AI tools; grammar and spell checking normally needs no declaration.

Where the declaration goes: Elsevier — immediately before the reference list. ACS and IEEE — the Acknowledgement. Springer Nature — Introduction or Acknowledgements. ICMJE — also in the cover letter.

Specific to reviews: ACS states that editors may reject or require revision where AI use appears excessive, naming generated literature reviews explicitly, and publishers now diverge on whether AI-assisted literature reviews are permitted at all. "My usual publisher allows it" is not a defence at a different journal — check the target journal's own guidelines.

11. Worksheet A — the prior-review comparison table

Complete this before writing anything else. It answers the mandatory question on every RSC and ACS proposal form, and it becomes a table in your published introduction.

Prior review (author, year, journal)	Window	Organising logic	What it does not do	What we add

If the final column is empty, the field does not need your review this year.

12. Worksheet B — your one-page review proposal

Fill this in within a week of the seminar, while the topic is still hot. It converts directly into a presubmission enquiry.

1. Working title

Descriptive and specific. It should carry your framework, not just the topic.

2. Thesis — one sentence an expert would argue with

3. Review type and target venue

Methodological type first (scoping / critical / tutorial / systematic), then the journal format that fits it, then the word and reference limits.

4. Scope

Population, Concept, Context. State explicitly what is excluded and which years are covered.

5. Why now, and why us

Field maturity evidence (paper counts from Gate 1), the gap left by prior reviews (Worksheet A), and your own papers on the topic from the last three years, with DOIs.

6. Section outline with your organising framework

Name the framework. List the sections it generates. Confirm they are mutually exclusive.

7. Deliverables and schedule

Estimated reference count, number of figures and tables, the three key tables, co-author roles, and a submission date.

13. Pre-submission checklist

- ☐ The scope and the years covered are stated in the introduction.
- ☐ The prior-review comparison table is present.
- ☐ The search is documented well enough for a referee to repeat it.
- ☐ The seed-set recall check is reported.
- ☐ Inclusion and exclusion criteria are written down.
- ☐ Every included study carries an evidence grade.
- ☐ No paragraph is about a single paper.
- ☐ Every section ends with a verdict, not a summary.
- ☐ The outlook names 3–5 specific, actionable challenges.
- ☐ Self-citation has been assessed by a co-author, not by the author.
- ☐ Every reference has been checked against the primary source.
- ☐ Word count, reference count and display items are within the journal's stated limits.

14. Sources and further reading

Typology	Grant & Booth, *Health Info. Libr. J.* **26**, 91 (2009) · Sutton, Clowes, Preston & Booth, *ibid.* **36**, 202 (2019)
Reporting standards	PRISMA 2020, PRISMA-ScR and PRISMA-S checklists and flow diagrams: **prisma-statement.org** · JBI Manual for Evidence Synthesis: **synthesismanual.jbi.global** · ROSES for environmental evidence: **roses-reporting.com**
Engineering method	Kitchenham & Charters, *Guidelines for Performing Systematic Literature Reviews in Software Engineering*, EBSE-2007-01 · Petersen, Vakkalanka & Kuzniarz, *Inf. Softw. Technol.* **64**, 1 (2015) · Niyato et al., *Methodological Guidelines for Survey Writing in Communications Research*, arXiv:2509.25828 (2025)
Searching	Gusenbauer & Haddaway, *Res. Synth. Methods* **11**, 181 (2020) · Gusenbauer & Gauster, *Technol. Forecast. Soc. Change* **212**, 123833 (2025) · PRESS 2015 search peer-review checklist
Appraisal	GRADE Handbook: **gradepro.org/handbook** · Shea et al. (AMSTAR 2), *BMJ* **358**, j4008 (2017) · JBI critical appraisal tools: **jbi.global/critical-appraisal-tools**
Craft	Pautasso, *PLoS Comput. Biol.* **9**, e1003149 (2013) · Palmatier, Houston & Hulland, *J. Acad. Mark. Sci.* **46**, 1 (2018) · Webster & Watson, *MIS Quarterly* **26**, xiii (2002) · "How to write an excellent Review article", *Nat. Rev. Bioeng.* **2**, 907 (2024) · Bahl, *J. Breast Imaging* **5**, 480 (2023)
The debate	Miranda & García-Carpintero, *J. Informetr.* **12**, 1015 (2018) · McMahan & McFarland, *Am. Sociol. Rev.* **86**, 341 (2021) · Ioannidis, *Milbank Q.* **94**, 485 (2016) · Kamat, Christopher & Jin, "Should You Really be Writing A(nother) Review Manuscript?", *ACS Energy Lett.* **10**, 5020 (2025)

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SUPPLEMENT 1 | KNOW THE TERMS, SHOW THE PROCESS

From selection to new knowledge

PRISMA documents selection. An evidence matrix makes comparisons visible. Synthesis supports a research gap and the review's contribution.

15. Research gap, review gap and novelty

Term	What it means
Research gap	An important question that current evidence cannot answer confidently within a stated scope. The uncertainty must matter for a scientific or practical decision.
Review gap	A question, comparison or perspective that existing reviews have not adequately synthesized. Check prior reviews before claiming this gap.
Review novelty	A new, useful and justified insight, synthesis or framework relative to prior reviews. It may change what we conclude, how we compare evidence, or what we should test next.

The chain: defined question and scope → transparent search and selection → evidence matrix and appraisal → synthesis of patterns and uncertainty → prioritized research gaps → a justified contribution.

16. PRISMA: a practical reporting workflow

PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses. It is a reporting guideline with a checklist and flow diagram; it is not a quality certificate. Use PRISMA 2020 for relevant systematic reviews, PRISMA-ScR for scoping reviews, and PRISMA-S for reporting searches. Select guidance that fits the review question and methods.

Before screening: define the question, eligibility criteria, sources and screening process. Save exact search strings, database/platform names and search dates.

During selection: deduplicate; log title/abstract decisions; retrieve reports; assess eligibility; record full-text exclusion reasons and how disagreements were resolved.

At reporting: reconcile the counts, distinguish records, reports and studies, link multiple reports from the same study, and complete the applicable checklist.

Fictional flow - arithmetic practice only
Identified 100 → duplicates removed 20 → records screened 80 → records excluded 50 → reports sought 30 → not retrieved 2 → reports assessed 28 → reports excluded 8 (wrong question 5; no primary evidence 3) → **20 reports covering 18 studies included.**

A narrative or critical review may report its search transparently without claiming a full systematic-review method. A completed flow diagram alone does not make a review systematic.

SUPPLEMENT 2 | WORKED EXAMPLE

Read across studies, then infer a gap

Fictional zinc-anode example for teaching only. These four rows are a separate exercise from the 18-study PRISMA count example.

17. Build an evidence matrix with comparable conditions

Use a row for each study, with linked report identifiers. Extract the question/context, method, operating conditions, comparator, outcome and uncertainty, replication, and limitations. Retain source locations so every cell is auditable.

Study	j / q	Cycle life under matched tests	Replication / limits
A	1 / 1	Coated > bare Matched conditions	n = 3 One laboratory
B	1 / 1	Coated > bare Matched conditions	n = 1 Limited replication
C	5 / 5	Coated ≈ bare Matched conditions	n = 3 One laboratory
D	5 / NR	Coated only No matched comparator	n = NR Incomplete reporting

j: current density (mA cm^{-2}); **q**: areal capacity (mAh cm^{-2}); **n**: replicate test cells. **NR = not reported, not zero.** Outcome: cycle life to a prespecified endpoint (higher is better here). **≈** means descriptively similar, not statistical equivalence. No pooling: comparable quantitative metrics are unavailable.

18. Turn a pattern into a candidate research gap

Step	Reasoning supported by this small exercise
Observe	A and B favor coating at 1/1; C shows a similar outcome at 5/5; D cannot estimate a coating benefit without a comparator.
Qualify	Conditions differ, replication is limited, and uncertainty/metrics are incomplete. The rows do not establish a universal condition effect or causal mechanism.
State the gap	In this sample, benefit under the higher current-density and areal-capacity condition (5/5) remains uncertain: only one matched comparison is shown and D is incomplete.
Prioritize a test	Replicate a matched coated-versus-bare protocol at 5/5 across laboratories, with prespecified outcomes, replicate counts and uncertainty estimates. Check a broader search before making a field-wide claim.

Potential review novelty: a condition-aware comparison or framework that reveals limits hidden by a list of cycle-life records. This becomes a contribution only if a full, appraised evidence base supports the insight and comparison with prior reviews shows what is new.

19. Recognize different kinds of uncertainty

Empty evidence: no eligible evidence found within the documented scope. **Weak evidence:** studies exist but cannot support a confident answer. **Contradiction:** comparable studies disagree. **Transferability:** evidence may not apply to another population, system or operating condition.

A blank cell may be a reporting problem. Missing reporting is not proof that an experiment was never performed. Check the source and supplemental information before coding absence.

SUPPLEMENT 3 | WORKSHEET C

Make the gap and novelty defensible

Use after the prior-review comparison table (Worksheet A). Keep the scope, evidence trail and decision relevance visible.

A. Define the boundary

Question, review type, population/system, conditions, sources and last search date.

B. Name the evidence pattern

Which matrix rows support the pattern? Which comparator/outcome is missing or inconsistent? What does appraisal change?

C. Write a research-gap statement

Within [scope/search date], [evidence pattern] leaves [question] uncertain because [reason]. This matters for [decision]. Resolve it with [study/comparator/outcome].

D. Write a review-novelty statement

Compared with [specific prior reviews], this review adds [new insight/synthesis/framework], supported by [evidence], enabling [changed understanding or decision].

Before calling it a gap: Is the claim bounded by the search? Does it distinguish absence from poor reporting? Does it survive appraisal? Does it matter? Can you name a study or analysis that would reduce the uncertainty?
Before calling it novelty: What can the reader understand or do after this review that prior reviews did not enable?

Clarifications to the shorthand on page 4. Primary-study novelty can also be a method, theory or analysis. Review novelty need not be a named framework. An updated review can contribute when the new evidence changes conclusions or decisions. A matrix, flow diagram, larger reference list or new date window alone is not enough; the contribution must follow from what the synthesis establishes.

20. Official methods resources and further reading

PRISMA 2020 (Page et al., 2021): doi:10.1371/journal.pmed.1003583
PRISMA-ScR: prisma-statement.org/scoping · PRISMA-S: prisma-statement.org/prisma-search
Robinson et al., Frameworks for Determining Research Gaps During Systematic Reviews (AHRQ): NCBI Bookshelf
Webster & Watson (2002), Analyzing the Past to Prepare for the Future: Writing a Literature Review: MIS Quarterly

SUPPLEMENT 4 | PUBLISHED EXAMPLES

Two real paths from evidence to novelty

Use the author's two published reviews to trace a review gap, the synthesis performed, the contribution and the remaining research gap.

21. Compare what each review adds

Teaching lens	Carbon-felt durability Sondit et al. | J. Power Sources	Battery-recycling order retention Eeamtak et al. | Green Chemistry
Review gap	Table 1 (p. 3) positions the review against prior syntheses: modifications need assessment by retained function, with explicit durability evidence requirements.	Recovery yield alone does not capture the structural organization that survives processing. The review reframes route selection around retained functional order.
Evidence / synthesis object	Fig. 2 and Table 6 (p. 12): proposed Tier 0-3 rubric. Table 8 (pp. 14-15): representative audit of **22 studies = 6 Tier 0 + 16 Tier 1**; none at Tier 2 or 3.	Fig. 4 (p. 12): **3 × 3 concept matrix, 6 populated and 3 empty cells**. Table 3 (p. 16): **10 case/condition rows from 8 references**; rows are not 10 independent studies.
Review novelty	A durability-first failure-mode and diagnostic framework, with an explicit evidence standard and a study-level appraisal. It changes how durability claims are judged.	An order-retention framework combining reset depth, repair windows and a reversibility ledger. It explains value retained beyond the amount of metal recovered.
Research gap supported	**No study in the 22-study audit met the complete cross-domain Tier 2 requirements.** This identifies the need for matched retention measurements across the required domains and relevant stressors.	The proposed numerical repair-window thresholds remain working hypotheses requiring chemistry-specific calibration and validation. Empty map cells flag a lack of reported examples, not impossible states.
Next evidence to seek	Matched beginning/end measurements of electrochemical, hydraulic, mechanical/interfacial and chemical retention, using the paper's checklist and stated stressors.	Studies that measure disorder and retained function against prespecified repair outcomes, calibrate chemistry-specific limits, and test the poorly represented matrix combinations.

Keep the claim narrower than the table. The JPS audit does not show that interfacial measurements are absent everywhere: one Table 8 entry reports interfacial tracking but still does not meet all Tier 2 requirements. In the Green Chemistry matrix, a blank cell is a prompt to check the literature and reporting before declaring an evidence gap.

Use each paper's own rules. The JPS Tier 0-3 definitions are a proposed, paper-specific durability rubric (Fig. 2; Tables 6-7). They differ from the generic teaching tiers in the earlier handout. A tier assignment describes the reported evidence for this durability claim; it is not an overall quality ranking.

These are synthesis and gap-identification examples. Neither supplied paper reports a PRISMA selection process; use the separate PRISMA teaching example for that workflow. An evidence table and a concept matrix do different jobs, and both can help make a review's intellectual contribution visible.

Sources and reading guide

Sondit et al. (2026), *Durability-first engineering of carbon felt electrodes for aqueous redox flow batteries: Failure modes, stress tests, and evidence standards.* Journal of Power Sources 694, 241310.
doi:10.1016/j.jpowsour.2026.241310
Eeamtak et al. (2026), *Beyond metal recovery in lithium-ion battery recycling: order retention as a sustainability framework from pack disassembly to interphase chemistry*. Green Chemistry.
doi:10.1039/d6gc03171d