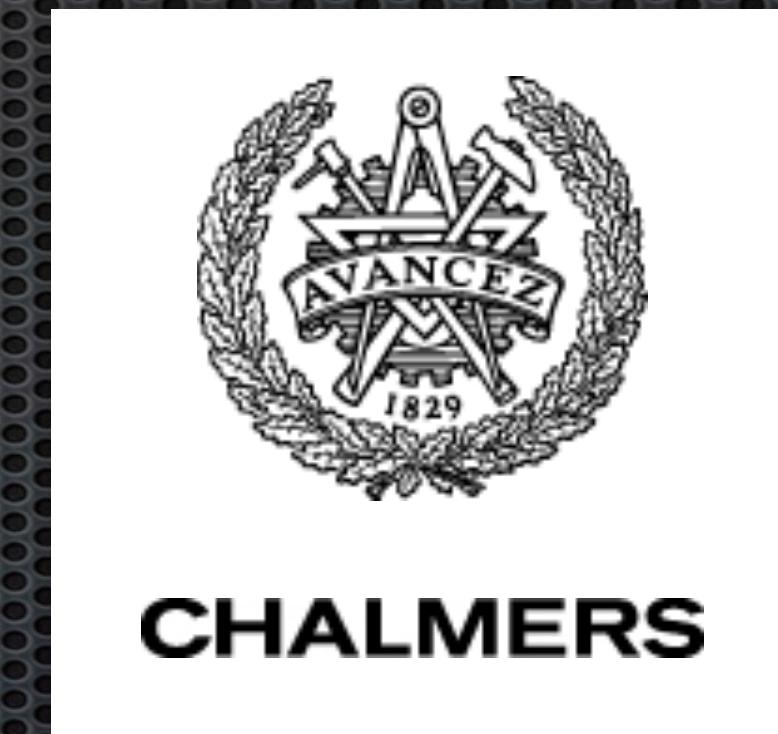


Writing, Reading and Reviewing Papers

20231117, NTNU, Trondheim
Robert Feldt



Who should be an author?

- Each author should have contributed
- Order of authors should reflect weight of contribution
 - In producing results and/or idea
 - In writing the paper
 - But often considered best to be among first 2 or to be last. First two should be mentioned when cited (“Feldt and Torkar showed...”, otherwise “Feldt et al showed...”)
- Better to be inclusive than exclusive
 - You can get enemies if you disregard contributions
 - Never disregard the importance of the basic idea, but what about “just funding”?!
- For Empirical SE, authors from industry can add “relevance”

Who should be an author?

16 Writing a Research Paper

16.1 Who should be an author?

One of the main ways to assign credit in academia is through the list of authors on papers. It is thus very important to have the right authors credited on your papers. If you ‘forget’ someone this could lead to a conflict; at the very least you will have to discuss with them and ‘clear the air’ afterwards, at the worst you have created a life-long, academic enemy.

The simple rule is that the people that have helped make a paper possible should be credited. And they should be credited in the order from larger contribution to smaller. Below we outline this in more detail; this is based on the rules and process for authorship that was developed by the seniors of the SERL group at BTH in October 2010³.

³The following people should thus be credited for these rules: Claes Wohlin, Jürgen Börstler, Robert Feldt, Cigdem Gencel, Tony Gorschek, Ludwik Kuzniarz, Kai Petersen, Darja Smite, Mikael Svahnberg and Richard Torkar

Who should be an author?

A person should be one of the authors of a paper if they have made a substantial contribution to

- the *research* **OR**
- the *drafting* of the article, **AND** have
- *reviewed* the paper (for important intellectual content) **AND** have
- given a final *approval* of the version to be published.

Note that the structure is (Research **OR** Drafting) **AND** Review **AND** Approval. If a person has contributed to the research or the drafting of the paper they should be given the chance to be an author. They take that chance by reviewing and approving the paper before submission.

CRediT - Contributor Roles Taxonomy

CRediT (Contributor Roles Taxonomy) is a high-level taxonomy, including 14 roles, that can be used to represent the roles typically played by contributors to research outputs. The roles describe each contributor's specific contribution to the scholarly output.

<https://credit.niso.org/>

Conceptualization

Data curation

Formal Analysis

Funding acquisition

Investigation

Methodology

Project administration

Resources

Software

Supervision

Validation

Visualization

Writing – original draft

Writing – review & editing

Whom are you publishing for?

- ❖ For the reader, NOT for you
 - ❖ (Or really for the reviewer :))
- ❖ Paper = Pedagogical explanation of the results
 - ❖ “You and me together”
 - ❖ A journey from where the reader currently is (knows) to the place where you are (understands)

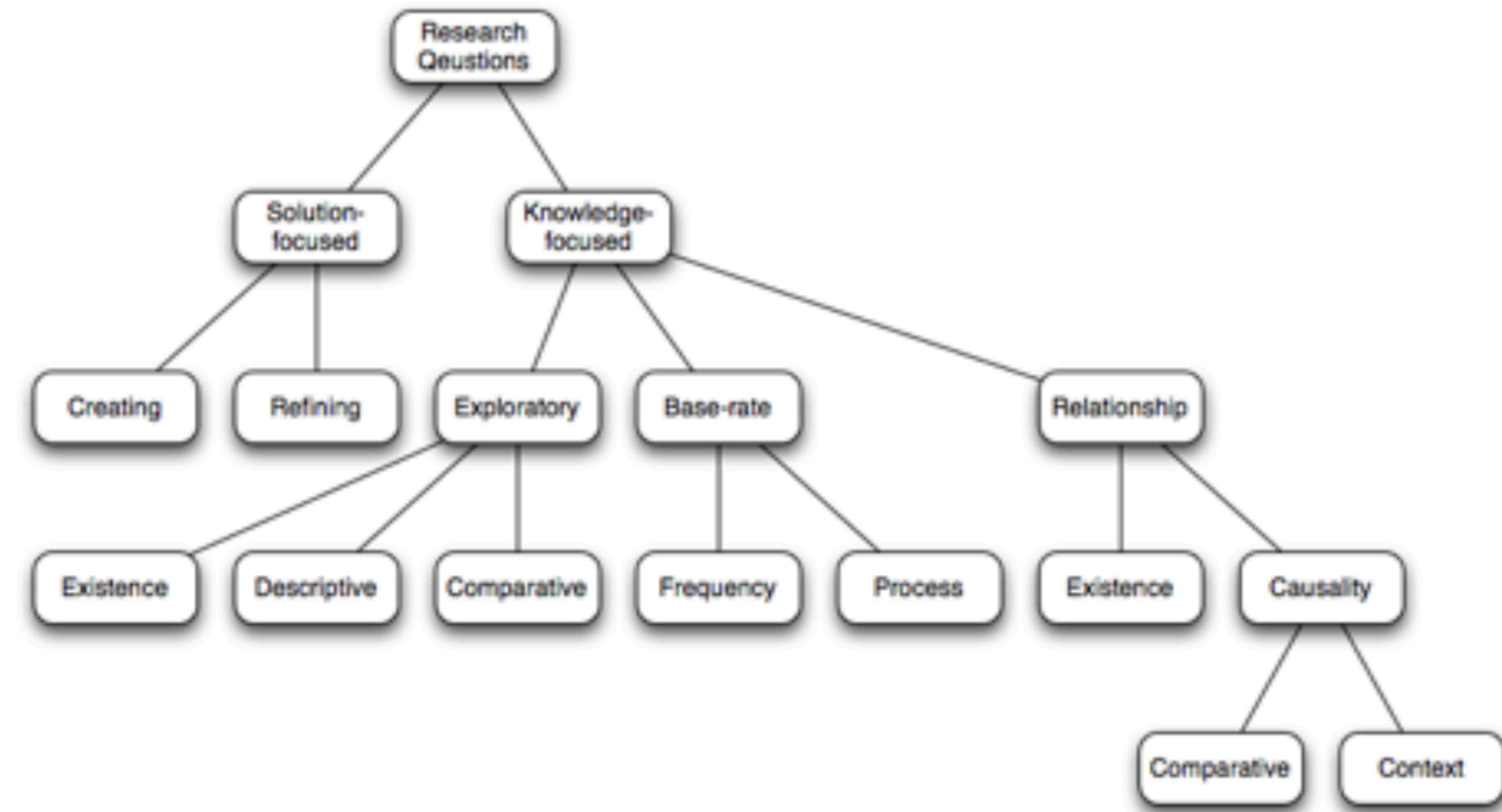
Whom are you publishing for?

- Golden rules:
 - Know your readers and their background
 - Imagine yourself as a reader
 - Ask yourself questions
 - Is this interesting? Is this relevant? Is this comprehensible?
 - Does this follow from what I have already said?
 - What questions are coming to the readers mind?
 - Do not speak highly of yourself or your work
 - Leave that to the reader
 - Avoid “strong” adjectives like “extremely”, use balanced language

What to claim in a paper?

- Typical claims:
 - First time...:
 - Solves a problem for the first time
 - Describes a common problem/process for the first time
 - Improves / Extends existing results/alternatives in 1-2 of dimensions:
 - Behavior: X has (Higher quality output / Higher success rate / Easier to understand) than Y+Z...
 - Coverage: X applicable in more situations than Y+Z...
 - Efficiency: X is faster or uses less resources than Y+Z...
 - Usability: X is easier to learn/use than Y+Z...
 - Replication

What to study in a paper?



What to study in a paper?

Main Types of RQs	Answers
Exploratory	Answers give clearer understanding, better definitions of concepts, evidence that we can measure them validly
Base-rate	Answers describe the normal pattern of occurrence of the phenomena
Relationship	Answers describe if and how two phenomena are related
Solution-focused	Describes better ways to solve some problem or situation. Examples are: <i>“What is an effective way to achieve X?”,</i> <i>“Which strategies help achieve X?”,</i> <i>“How can we refine S to achieve X in a better way?”</i>

Sub-Types of RQs	Examples
Exploratory/Existence	<p><i>“Does X exist?”,</i> <i>“Is Y something that software engineers really do?”</i></p>
Exploratory/Descriptive	<p><i>“What is X like?”,</i> <i>“What are its properties/attributes?”,</i> <i>“How can we categorize/measure X?”,</i> <i>“What are the components of X?”</i></p>
Exploratory/Comparative	<p><i>“How does X differ from Y?”</i></p>
Base-rate/Frequency	<p><i>“How often does X occur?”,</i> <i>“What is an average amount of X?”</i></p>
Base-rate/Process	<p><i>“How does X normally work?”,</i> <i>“What is the process by which X happens?”,</i> <i>“In what sequence does the events of X occur?”</i></p>
Relationship/Existence	<p><i>“Are X and Y related?”,</i> <i>“Do occurrences of X correlate with Y?”,</i> <i>“What correlates with X?”</i></p>
Relationship/Causality	<p><i>“What causes X?”,</i> <i>“Does X cause Y?”,</i> <i>“Does X prevent Y?”,</i></p>
Causality/Comparative	<p><i>“Does X cause more Y than Z does?”,</i> <i>“Is X better at preventing Y than Z is?”</i></p>
Causality/Context	<p><i>“Does X cause more Y under one condition than others?”</i></p>

JOSEPH M. WILLIAMS

STYLE

TOWARD CLARITY
AND GRACE

FROM THE PUBLISHERS OF
THE CHICAGO
MANUAL OF STYLE

THE

Sense of Style

the THINKING PERSON'S GUIDE
to WRITING in the 21st CENTURY!

Steven Pinker

author of THE LANGUAGE INSTINCT
and THE BLANK SLATE

Mensch & Kording's 10 rules for structuring papers (4 Principles)

- 1. Focus on a central contribution, which you communicate in the title
- 2. Write for flesh-and-blood human beings who do not know your work
 - You are expert on your work so least qualified to judge your writing from perspective of a naive/non-knowing reader
- 3. Stick to the context-content-conclusion (C-C-C) scheme
 - Whole-paper: intro sets context, results is content, discussion brings home the conclusion
 - Paragraph: 1st sentence defines context, body is content, last sent. provides conclusion
- 4. Optimize your logical flow by avoiding zig-zag and using parallelism
 - Zigzag: only central idea of paper should be touched upon multiple times
 - Parallelism: parallel messages should be communicated with parallel form

Mensch & Kording's 10 rules for structuring papers (4 Components)

- 5. Tell a complete story in the abstract
 - Context = intro to field + sub-question, specific missing gap, why important
 - Content = method/approach + executive summary of result
 - Conclusion = interprets results and answers question from context
- 6. Communicate why paper matters in the introduction
 - progressively more specific paragraphs to clarify what is lacking in the literature, followed by a paragraph summarising what is done to fill gap.
- 7. Deliver results as sequence of statements that logically connect to support central contribution
 - convince the reader that the central claim is supported by data and logic

Mensch & Kording's 10 rules for structuring papers (4th Comp.)

- 8. Discuss how the gap was filled, the limitations of the interpretation, and the relevance to the field
 - typically done by recapitulating the results, discussing the limitations, and then revealing how the central contribution may catalyze future progress.
 - first discussion paragraph is special in that it generally summarizes the important findings from the results section. Context = intro to field + sub-question, specific missing gap, why important

Mensch & Kording's 10 rules for structuring papers (2 Process)

- 9. Allocate time where it matters: Title, abstract, figures, and outlining
 - The central logic that underlies a scientific claim is paramount, outline as you go along
 - Title, abstract, and figures are viewed by far more people than the rest of the paper
- 10. Get feedback to reduce, reuse, and recycle the story
 - Use test readers to check that your story and paper works; apply checklist

Mensch & Kording's 10 rules for structuring papers (Checklist)

Rule	Sign it is violated
1: Focus on one big idea	Readers cannot give 1-sentence summary.
2: Write for naive humans	Readers do not “get” the paper.
3: Use context, content, conclusion structure	Readers ask why something matters or what it means.
4: Optimize logical flow	Readers stumble on a small section of the text.
5: Abstract: Compact summary of paper	Readers cannot give the “elevator pitch” of your work after reading it.
6: Introduction: Why the paper matters	Readers show little interest in the paper.
7: Results: Why the conclusion is justified	Readers do not agree with your conclusion.
8: Discussion: Preempt criticism, give future impact	Readers are left with unanswered criticisms and/or questions on their mind.
9: Allocate time wisely	Readers struggle to understand your central contribution despite your having worked hard.
10: Iterate the story	The paper’s contribution is rejected by test readers, editors, or reviewers.

Process of publishing (Selection)

- Really good articles are always published
- Really bad articles shall never be published
- Large number of articles eventually will be published
 - No major loss if they are not published
 - No major harm if they are published
- Published or not means a lot to individual but not to journal

Double-Blind Reviewing

- http://www.robertfeldt.net/advice/double_blind_reviewing/

Empirical evidence in relation to Double Blind Reviews

- Reviewers can guess the actual authors about 25–42% of the time (as summarised in [Budden et al 2008](#))
- US papers are evaluated more favorably (by both US and non-US reviewers), with US reviewers showing a stronger preference for US papers than non-US reviewers ([Link 1998](#))
- Blinding and unmasking made no editorially significant difference to review quality, reviewers' recommendations, or time taken to review ([van Royen 1998](#))
- Reviewers were more critical in DBR ([Blank 1991](#))
- Female authors fared somewhat better in DBR than in SBR but effects were small ([Blank 1991](#))
- Authors at near-top-ranked institutions and non-academics had lower acceptance rates but other groups largely unaffected ([Blank 1991](#))
- SB reviewers were significantly more likely than their DB counterparts to recommend for acceptance papers from famous authors and top institutions ([WSDM 2017 DBR Experiment](#)). The paper quantifies the effect and says: "...estimated odds multiplier is around 1.5x, so the result is quite strong."

Open Science

- <https://link.springer.com/article/10.1007/s10664-019-09712-x>

Published: 02 May 2019

The open science initiative of the Empirical Software Engineering journal

[Daniel Méndez Fernández](#), [Martin Monperrus](#), [Robert Feldt](#)✉ & [Thomas Zimmermann](#)

Empirical Software Engineering **24**, 1057–1060 (2019) | [Cite this article](#)

3884 Accesses | **10** Citations | **31** Altmetric | [Metrics](#)

Registered Reports

- EMSE + Conferences, example MSR 2024:
 - <https://2024.msrconf.org/track/msr-2024-registered-reports>

(Pre-)Registered Reports

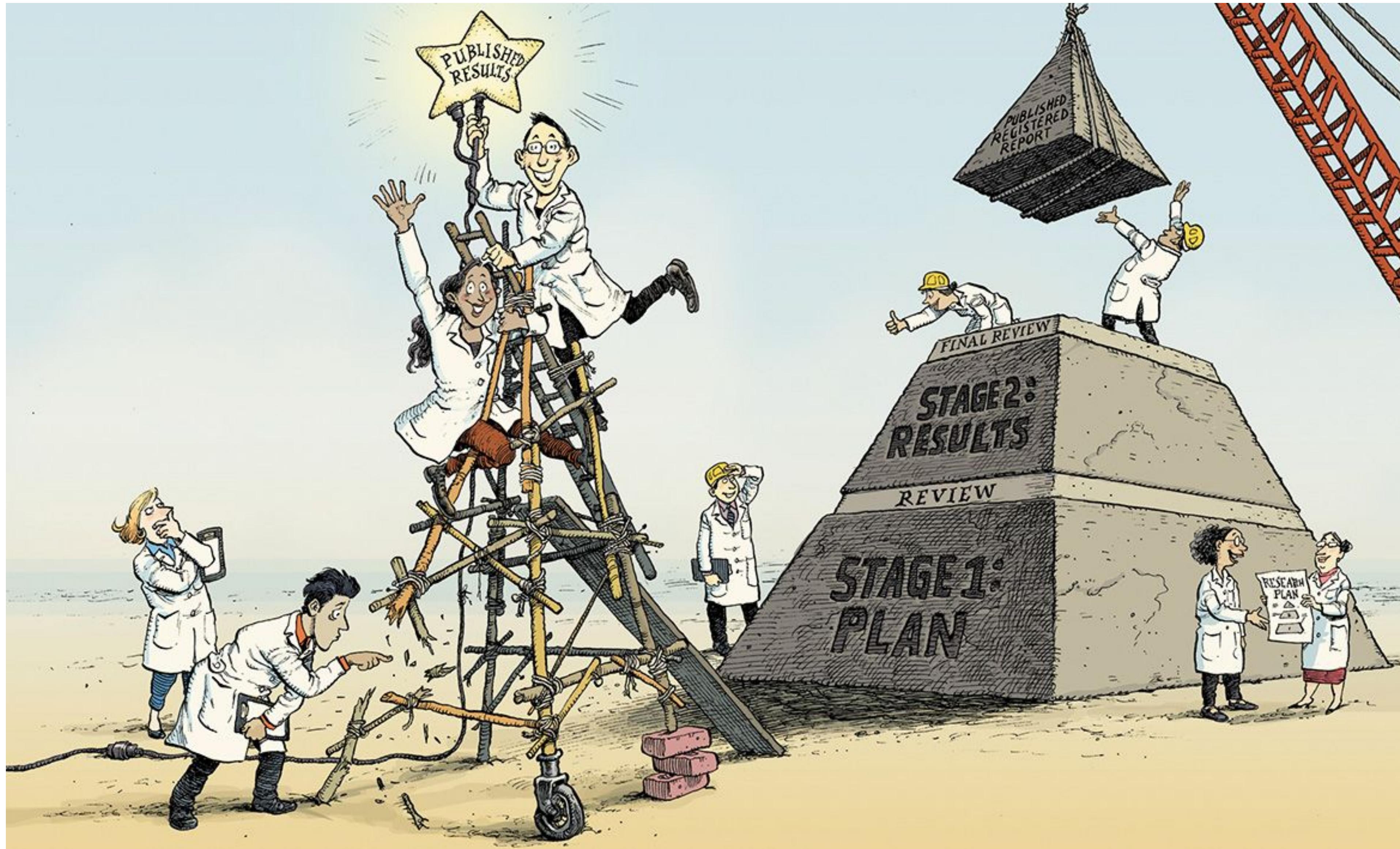
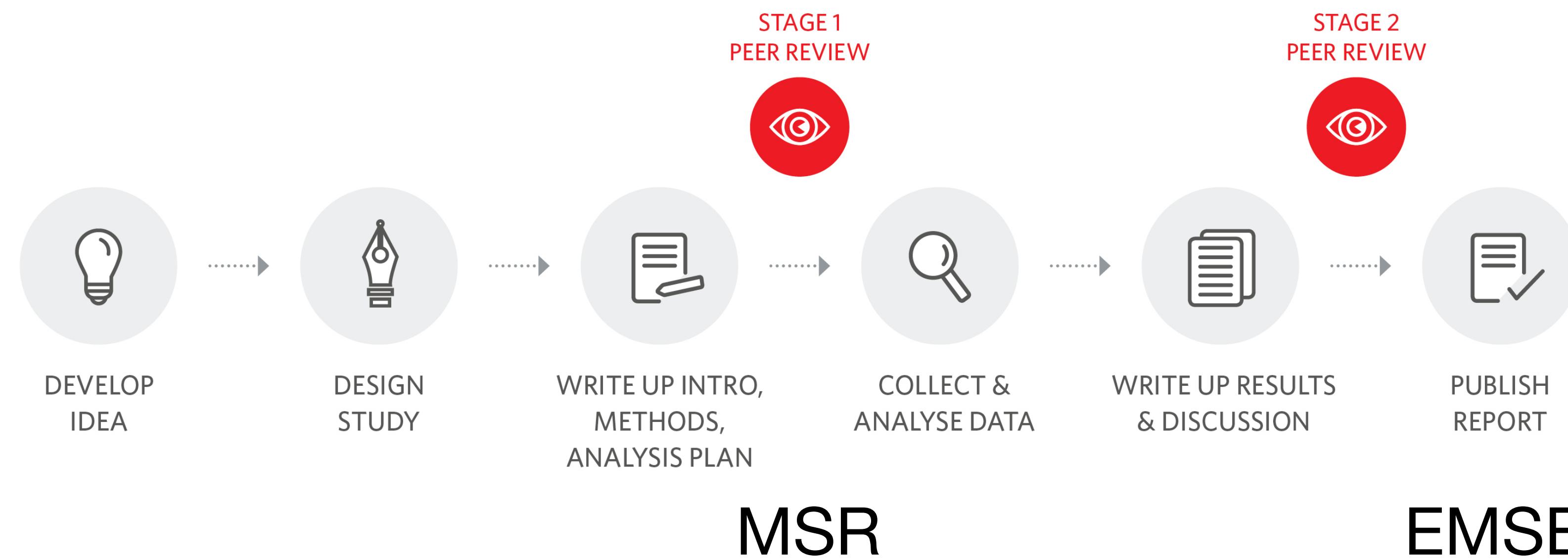


Illustration by David Parkins in Nature, September 2019

Truth Fix: (Pre-)Registered Reports



A form of self-blinding, next step after double blind!

200+ Journals today offer pre-registration!

Acceptance rate in stage 2: 90% (Cortex journal)

Null results: 66% RR replicat., 50% RR novel, 5-20% non-RR

Counterpoint: (Pre-)Registered Reports

RRs for confirmatory, hypothesis-driven research

They are not a good fit for more exploratory work

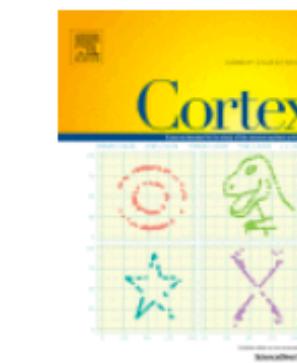
Alternative: Explorative Reports?

Counterpoint: (Pre-)Registered Reports



Cortex

Volume 96, November 2017, Pages A1-A4



Editorial

Exploratory reports: A new article type for *Cortex*

Robert D. McIntosh

[Show more](#)

<https://doi.org/10.1016/j.cortex.2017.07.014>

[Get rights and content](#)



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[Next article in issue](#)

There are many ways to find things out. In science, the process of discovery can be divided conceptually into exploratory and confirmatory phases. In the exploratory phase, we observe and explore, generating theories to explain the patterns that we find. Useful theories will support predictions about what we should and should not find in the future if

ACM TOSEM Registered Reports

ACM Transactions on Software Engineering and Methodology

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- Cristian Cadar

Guest Editors

- Marcel Böhme
- Abhik Roychoudhury
- Burak Turhan

We invite contributions for Registered Papers in *ACM Transactions on Software Engineering and Methodology (TOSEM)*.

<https://dl.acm.org/journal/tosem/registered-papers>

Reviewers' foci? Judging relevance?

Let's discuss!

- PQ3.1. What are the top-3 things you think a reviewer **should** focus on when reviewing an SE paper? Why?
- PQ3.2. What are some aspects a reviewer **should put less** emphasis on when reviewing a paper? Why?
- PQ3.3. Would you say that reviewers tend to be good at judging the **relevance** of a piece of research? How do you think they tend to judge **relevance**?

The Task of the Referee

Alan Jay Smith

University of California at Berkeley

The referee's task

Your role as referee is to decide whether a paper makes a *sufficient contribution* to the field. The contribution can be new and interesting research results, a new and insightful synthesis of existing results, a useful survey of or tutorial on a field, or a combination of those types. To quote a referee for this article:

Small results which are surprising and might spark new research should be published; papers which are mostly repetitions of other papers should not; papers which have good ideas badly expressed should not be published but the authors should be encouraged to rewrite them in a better, more comprehensible fashion.

Reading a paper as a referee is closer to what a teacher or professor does when grading a paper than what a scientist or engineer does when reading a published work. In the latter case, the reader presumes that the paper has been checked (refereed) and is thus correct, novel, and worthwhile. As a referee, on the other hand, you must read the paper carefully and with an open mind, checking and evaluating the material with no presumption as to its quality or accuracy. The result

ACM SIGSOFT Empirical Standards

Version 0.1.0

OCTOBER 8

Paper and Peer Review Quality Task Force
Edited by: Paul Ralph

<https://github.com/acmsigsoft/EmpiricalStandards> ▾



<https://www2.sigsoft.org/EmpiricalStandards/tools/>

General standard:

<https://www2.sigsoft.org/EmpiricalStandards/docs/?standard=GeneralStandard>

Good Review Practices

Reviewers evaluate a manuscripts' trustworthiness, importance and clarity. The results must be, primarily, true (trustworthy) and, secondarily, important. A paper that is trustworthy can be accepted even if it is not important. A paper that is not trustworthy cannot be accepted, even if it seems important. Papers that are both trustworthy and important can have priority. Papers must be clear enough to judge their trustworthiness and importance. Reviewers should endeavor to:

- Reflect on and clearly state their own limitations and biases.
- Clarify which are necessary and which are suggested changes. Ideally, separate them.
- Identify parts of the paper that you cannot effectively judge or did not review.

Reviewing Antipatterns

- Applying empirical standards in a mechanical, inflexible, box-ticking or gotcha-like manner.
- Rejecting a study because it uses a methodology for which no specific standard is available.
- Skimming a manuscript instead of carefully reading each word and inspecting each figure and table.
- Unprofessional or vitriolic tone, ad hominem attacks, disparaging or denigrating comments.
- Allowing the authors' identities or affiliations to affect the review.
- Focusing on superficial details of paper without engaging with its main claims or results.
- Requesting additional analysis not directly related to a study's purpose or research question, leading to results poorly linked to the article's narrative.
- Using sub-reviewers when the venue does not explicitly allow it.
- Using the review to promote the reviewer's own views, theories, methods, or publications.

From ICSE 2024 PC guidelines (credit go to ICSE PC Chairs):

What fits in ICSE, and what does not?

We will consider a paper to be **in scope if it brings insights to the field of software engineering**

Papers contributing to other fields (e.g., machine learning, compilers, hardware) **without a clear link to software engineering will be considered out of scope**

In the following, we provide details and examples of what would be expected for papers belonging to different sub-areas of software engineering

Note: some areas (software evolution, in particular) may not have specific restrictions as they inherently represent software engineering topics

From ICSE 2024 PC guidelines:

Area: Artificial Intelligence and Software Engineering - *outside scope examples*

- A paper that designs a new AI algorithm with no clear link to software engineering or clear justification how it will advance the state of research and/or practice in software engineering
- A paper that applies an existing AI algorithm to non-software engineering data with no clear link to software engineering or clear justification for how it will advance the state of research and/or practice in software engineering
- A paper that provides a theoretical characterization of a property of an AI algorithm with no clear link to software engineering or clear justification for how it will advance the state of research and/or practice in software engineering
- A paper that presents a method claimed to be designed for AI-based systems without describing clearly the context within the software engineering process, task and/or tool in which the method will be used for building/maintaining/testing AI-based systems

From ICSE 2024 PC guidelines:

Review — *A Strategy*

1. Remember to refer to this slide when reviewing. **Bookmark** it!
2. Before reading a paper, remember the **reviewing criteria** by reviewing these slides.
3. Read the paper, and as you do, note **positive and negative aspects** for each of the five criteria.
4. Use your notes to **outline a review organized by the five criteria**, so authors can understand your judgments for each criteria.
5. **Draft your review** based on your outline.
6. Edit your review, making it as **constructive and clear as possible**. Even a very negative review should be respectful to the author(s), helping to educate them.
7. Based on your review and your assessment of the individual criteria, choose a **recommendation score**.

Review – *Novelty*

The novelty and innovativeness of contributed solutions, problem formulations, methodologies, theories and/or evaluations, i.e., the extent to which the paper is sufficiently original with respect to state-of-the-art.

Grounded in adequate review of prior work in a respective topic, it is up to the authors to convince you that the discoveries advance our knowledge in some way, whether it sheds more light on prior work, or adds a significant new insight. Note

- A novel idea with great potential can make a very valuable paper even with only preliminary evaluation, whereas
- An incremental idea might need more support.

From ICSE 2024 PC guidelines:

Review — *Rigor*

The soundness, clarity and depth of a technical or theoretical contribution, and the level of thoroughness and completeness of an evaluation.

The paper should answer the questions it poses, and it should do so with rigor in its research methodology (including choosing an appropriate research methodology and procedures). This is an important difference between research papers and other kinds of knowledge sharing (e.g., experience reports), and the source of certainty researchers can offer. In that sense, rigor goes beyond checking soundness of paper. It would also be a check on whether the authors have thought the problem through.

From ICSE 2024 PC guidelines:

Review – *Relevance*

The extent to which the paper's contributions beyond prior work in terms of implications for software engineering research and practice, and if needed, under which assumptions

In all generality, impact relates to advances in the practice of software engineering (including making software less costly, more maintainable, more reliable, more reusable, safer, more secure, more usable ... – this is not an exhaustive list)

Note that it is the **authors' responsibility** to explain and interpret the relevance of contributions, why they matter, what their potential implications will be, and under which assumptions.

From ICSE 2024 PC guidelines:

Review – *Relevance*

Please take note of the following while evaluating relevance.

- **Take the perspective of the targeted stakeholder:** How would this advance our knowledge? How could this impact my work? Under which assumptions?
- **Do** assess technical contributions in light of **all** involved costs and risks. Weigh reported utility against required effort for setup and maintenance.
- **Assess** technical contributions not only by their evaluation results, but also by the **potential implications** of the underlying ideas. Consider pathways to deployment
- **We welcome insights** about the **practice of software engineering**.
- **Do** consider that impact can also result through **methodological contributions**.

From ICSE 2024 PC guidelines:

Review – *Verifiability and Transparency*

The extent to which the paper includes sufficient information to understand how an innovation works; to understand how data was obtained, analyzed, and interpreted; and how the paper supports independent verification or replication of the paper's claimed contributions.

This aims to check whether the described research is *recoverable*. You should be able to understand most of the key details about how the authors conducted their work, how they made their invention possible, or how the research findings were inferred from the collected evidence. This is key for replication and meta-analysis of studies underpinned by the positivist or post-positivist approaches. For interpretivist works, it is also key for evaluating qualitative work. Focus your critiques on omissions of research process or innovation details that would significantly alter your judgement of the paper's validity, or the *credibility* of results for research that uses qualitative methods.

From ICSE 2024 PC guidelines:

Review – Presentation

The extent to which the paper's quality of writing meets the high standards of ICSE, including clear descriptions, as well as adequate use of the English language, absence of major ambiguity, clearly readable figures and tables, and adherence to the formatting instructions provided below.

Papers also need to be clear and concise, and comprehensible to diverse audiences.

We recognize that not all authors are fluent English writers. But if the language issues make the paper not comprehensible, it is not yet ready for publication.