

Memo

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Hints for Project and Thesis Writing @ Aircraft Design and Systems Group (AERO)

Your project or thesis writing starts with a **Systematic Literature Review** (SRL). Make use of the **Sources of Scientific Information** best suited for your SRL and your work at AERO. We follow **Scientific Writing to Standards** and will mostly write in (American) English for best dissemination. As such the **Hints to Scientific Writing in English** are helpful for those non-natives to English. We have our special ways of **Report Writing @ AERO**, which are surely beneficial beyond the research group. Read **What Gets Wrong Again and Again** and avoid repeating the mistakes others have done.

Literature Review



Find the way into this topic with a guide from Charles Sturt University (CSU) in Australia. This is a whole sequence of web pages: <https://libguides.csu.edu.au/review> (archived at: <https://web.archive.org>). It explains:

A **literature review** will help you to identify patterns and trends in the literature so that you can identify gaps or inconsistencies in a body of knowledge. This should lead you to a sufficiently focused research question that justifies your research.

Types of literature review:

- **General literature reviews** form the introduction to a thesis or dissertation and must be defined by the research objective, underlying hypothesis or problem or the reviewer's argumentative thesis.
- **Theoretical literature reviews** examine how theory shapes or frames research.
- **Methodological reviews** outline the strengths and weaknesses of the methods used.
- **Historical literature reviews** focus on examining research throughout a period of time, often starting with the first time an issue, concept, theory, or phenomena emerged in the literature, then tracing its evolution within the scholarship of a discipline. The purpose is to place research in a historical context to show familiarity with state-of-the-art developments and to identify the likely directions for future research.

Approaches to a literature review:

- **Systematic literature review (SLR)** is a comprehensive, transparent search conducted over multiple databases and grey literature that can be replicated and reproduced by other researchers. It involves planning a well thought out search strategy which has a specific focus or answers a defined question. The review identifies the type of information searched, critiqued and reported within known timeframes. The search terms, search strategies (including database names, platforms, dates of search) and limits all need to be included in the review.
- **Traditional or narrative literature reviews** is in contrast to the SLR less systematic. It depends on available research data, has no method, has a high risk of bias, and depends on the author. For this reason, the *traditional literature reviews should be replaced by the SLRs*.

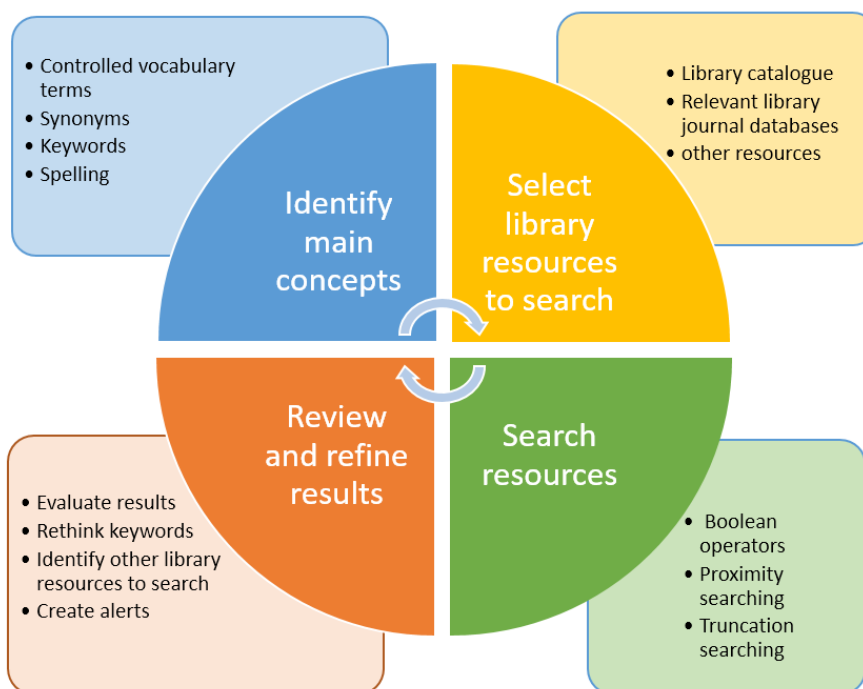


Figure 1: Literature review search cycle (https://libguides.csu.edu.au/review/Search_Strategies)

As with most solutions, you need to iterate (Figure 1). You start with sources and keywords and see if it works. As you understand more about your topic you finalize your approach. Select your sources (library catalogues, databases, ...). Search with a list of keywords. Use Boolean operators and truncation searching. Evaluate your results. Do you find what you are looking for? Change your keywords. Add other databases. Once you are satisfied with what you get. Write everything down in a systematic way. On which database with what keywords you get how many results. Down select based on title, based on abstract, and finally by reading the text of the document. Report on your findings. See also Figure 3.

Another English text "Writing a Literature Review" is from Purdue Online Writing Lab (OWL): https://owl.purdue.edu/owl/research_and_citation/conducting_research/writing_a_literature_review.html

Archived at: <https://perma.cc/MV5P-7ELV>



The library of the Technical University Berlin (TU Berlin) explains the SLR in German starting with https://www.dbwm.tu-berlin.de/menue/fuer_forschende_lehrende/methode_systematic_literature_review (archived at: <https://web.archive.org>). These are several pages. I translate the sequence of activities from Figure 2:

1. Define your research question.
2. Define your databases.
3. Define your keywords.
4. Collect your findings from all your databases.
5. Select the documents you want to evaluate further.
6. Review your retrieved sources.
7. Summarize your results.



Figure 2: Steps of a Systematic Literature Review (SLR)



Skript der Technischen Universität Dresden (TU Dresden) "**Leitfaden Literaturrecherche**"
(angepasst an unsere Anforderungen):

https://www.fzt.haw-hamburg.de/pers/Scholz/arbeiten/TU_Dresden_Leitfaden_Literaturrecherche_SLZ.pdf



Kurzanleitung der FH Münster "**Workflow Literaturrecherche**" (Figure 3):

https://www.fh-muenster.de/phy/labore/medizintechnik/downloads/Workflow_einer_wissenschaftlichen_Literaturrecherche.pdf

Archiviert als: <https://perma.cc/G6PS-PBA3>

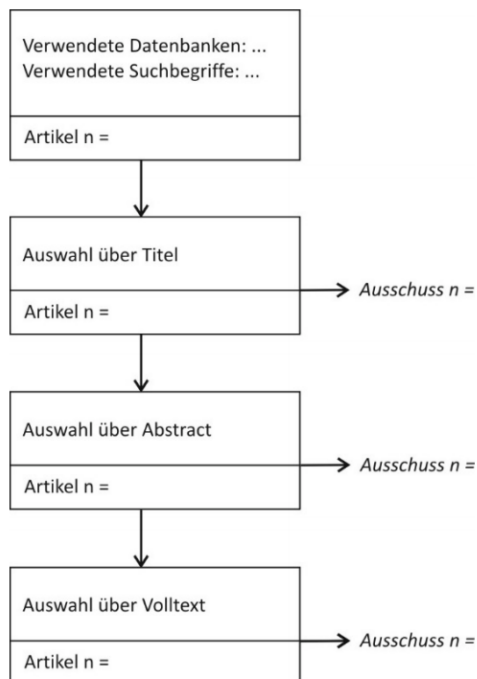
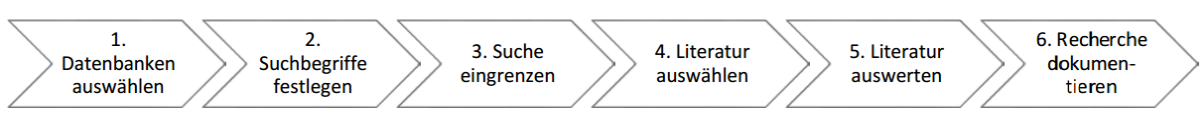


Figure 3: The systematic shows, what makes a "**Systematic Literature Review**" (SLR)



Anleitung mit Übung "**Grundlagen der Recherchekompetenz**":

https://hoo-haw.github.io/hoou_grundlagen_recherchekompetenz/public/de.html

Es geht um die Prinzipien und Techniken einer Recherche:

- Formale oder inhaltliche Recherchen
- Trunkieren (? und *)
- Verknüpfen (UND / ODER / NICHT)
- Phrase (" ")
- Schlagwort
- Klassifikation

Nach dem Durcharbeiten dieser Übung sollten Sie mit Bibliothekskatalogen zurecht kommen.

Sources of Scientific Information with Focus On Aeronautical Engineering @ AERO

Own Sources

- http://books_at_aero.ProfScholz.de
- <http://reports-at-aero.ProfScholz.de>
- <http://library.ProfScholz.de> (make use of the work of other students on your topic)
- <http://publications.ProfScholz.de> (my publications since 2010)
- <http://paper.ProfScholz.de> (my publications up to 2013)
- <http://literatur.ProfScholz.de> (HAW Hamburg aero books bought from 1999 to 2009)
- <http://ProfScholz.de> (links to lists of newer aero books at the bottom of the page)

Libraries Germany

- <https://katalog.haw-hamburg.de> and <https://www.haw-hamburg.de/hibs/recherche>
- <https://reposit.haw-hamburg.de> (Institutional repository of HAW Hamburg)
- <https://dnb.de> (Deutsche Nationalbibliothek / German National Library)
- <https://www.subito-doc.de> (Order documents from German libraries)
- <https://kvk.bibliothek.kit.edu> (KVK - Karlsruhe Virtual Catalog)
- <https://opac.k10plus.de> (Union catalog of libraries of 10 German federal states: GBV & SWB)
- <https://www.gateway-bayern.de> (Libraries in Bavaria: BVB)
- <https://portal.kobv.de> (Libraries in Berlin and Brandenburg: KOBV)
- <https://www.hebis.de> (Libraries in Hessen and Rheinland-Pfalz: HeBIS)
- <http://oceanos-www.hbz-nrw.de> (Libraries in Nordrhein-Westfalen and Rheinland-Pfalz: hbz)



Figure 4: German library consortia (<https://de.wikipedia.org/wiki/Bibliotheksverbund>)

Libraries International

- <https://www.worldcat.org> ("The World's Largest Library Catalog")
- <https://catalog.loc.gov> (Library of Congress, USA)
- <http://explore.bl.uk> (British Library, also online content)
- <http://libris.kb.se> (Royal Library Sweden)
- <http://www.diva-portal.org> (Finding tool for Swedish institutional repositories)

Scientific Search Engines and Databases

- <https://webofknowledge.com> (Web of Science; no access from HAW Hamburg)
- <https://www.scopus.com> (Scientific database; access HAW Hamburg / VPN; selected browsers)
- <https://scholar.google.com> (Google's scientific search engine)
- <https://www.researchgate.net> (Research social network and file sharing platform)
- <https://academic.microsoft.com> (Microsoft's academic search engine)
- <https://www.semanticscholar.org> (Scientific literature search focusing on textual understanding)
- <https://www.OpenAire.eu> (EU research portal)
- <https://core.ac.uk> (Repository portal and full text archive)
- <https://www.base-search.net> (Repository portal)
- <http://search.ndltd.org> (Global electronic theses and dissertations)
- <https://www.dart-europe.org> (European electronic theses and dissertations)
- <https://engrxiv.org/discover?subject=engrXiv|Engineering|Aerospace Engineering> (PrePrints)

Aeronautical Institutions

- <https://ntrs.nasa.gov> (Publications of NASA)
- <https://arc.aiaa.org/search> (see abstracts)
- <https://saemobilus.sae.org> or <https://www.sae.org/search> (see abstracts)
- <https://elib.dlr.de> (Publications of DLR)

Publishers

- <https://www.sciencedirect.com> (Search engine from Elsevier; access via HAW Hamburg / VPN)
- <https://link.springer.com> (Search engine from Springer; access via HAW Hamburg / VPN)
- <https://www.mendeley.com> (Shared research results by Elsevier)

Licensed Databases (HAW Hamburg / VPN)

- <https://knovel.com> (Engineering Data and Technical References)
- <https://perinorm.com> (Standards)

DOI Providers

- <https://commons.datacite.org> (DOIs for all kinds of research data)
- <https://search.crossref.org> (DOIs of journal articles)

Scientific Writing to Standards

- <http://buch.ProfScholz.de> (In German. Get the book¹ from the HAW Hamburg library.)
- <http://DIN.ProfScholz.de> (For German students: German standards for scientific writing.)
- <http://standards.ProfScholz.de> (For international students: Standards for scientific writing.)

User: student

PW: mobiles

Hints to Scientific Writing in English

Links

- That helped me as a student:
<https://owl.english.purdue.edu>
- Use Transitional Words and Phrases:
<http://www.fzt.haw-hamburg.de/pers/Scholz/arbeiten/Transition.pdf>
- Correct Punctuation:
<http://www.fzt.haw-hamburg.de/pers/Scholz/arbeiten/Punctuation.pdf>
- Grammar, Punctuation, Vocabulary:
 - <http://www.grammarbook.com>
 - <https://learnenglish.britishcouncil.org/english-grammar-reference>
- Dictionary: <http://dict.leo.org>
- Thesaurus: <http://www.thesaurus.com>
- Find more links on <http://ArbeitenHinweise.ProfScholz.de>

Grammar and Syntax (based on Elsevier's Language Editing Checklist)

- Use American English spelling consistently throughout your document.
- Check your paper thoroughly for spelling errors. Use the spell checker from your word processor (Word, LibreOffice, ...). Consult an online dictionary like <https://dict.leo.org>. Pay attention especially to the terminology in your scientific field.
- Use correct word inflection. Inflection is the addition of affixes to the word to change its relationship to the other words in a sentence. For example, the -s in dogs or the -ed in played. Check for correct subject-verb agreement. For example, 'they is going...' should be corrected to 'they are going...'.
 - Check for proper use of definite articles (the) and indefinite articles (a, an).
 - Check for proper use of prepositions (of, to, on, onto, etc...).
 - Check for complete and correct punctuation (full stops at the end of sentences, proper use of commas, semicolons, etc...) and a correct number of blanks around them.
 - Check for spelling inconsistencies of the same word within the article.
 - Ensure proper use of metaphors and figures of speech.
 - Check for consistency in the use of the decimal point ($47.9 = 47 + 9/10$). Write 6000 not 6,000 or 6 000.

¹ Für die deutschen Studierenden:
Bitte berücksichtigen Sie jede Zeile des Buches, wenn Sie Ihren Text schreiben!

Report Writing @ AERO

Your report has to include a table of contents, a list of figures, a list of tables, a list of symbols and a list of abbreviations as well as a standard introduction chapter (always with the same sub-chapters). It is very important to have an abstract in the beginning and a list of references at the end of the report.

Concerning the layout of the report we have some standards. You must use the **report template** either for MS Word or Open Office (or Latex) with the **Word styles**: <http://buch.ProfScholz.de>. These templates are generic. The title page has to be found for every university separately. This is why we need more:

<https://www.fzt.haw-hamburg.de/pers/Scholz/arbeiten/TitleAndDocumentationPage.docx> shows how to format **the first pages** of the report (Project / (international) Bachelor Thesis / (international) Master Thesis) at AERO. The file also includes the Word styles. As such your writing could as well start from this file.

For those who graduate with a Bachelor Thesis / Master Thesis from **HAW Hamburg**: You have to use the official first page with a green background. The link to that page keeps changing. The file needs corrections (e.g. the HAW Hamburg logo). Please see <http://ArbeitenHinweise.ProfScholz.de> for details.

International students: In addition to the HAW Hamburg layout, you may want to prepare in addition a version of your report with the official cover from your own university.

You can find finished project reports and theses conducted at AERO here: <http://library.ProfScholz.de>. Please refer to them if in doubt about anything in particular. I made sure that all reports in the library are somewhat up to standards and not too misleading for students following them. There you get an idea how the report should look like and what should be included. These reports are based on the templates mentioned above. In these reports you also see the style of referencing that we (have) use(d).

We changed from referencing based on DIN 1505 Part 2 and Part 3 to **ISO 690**. DIN 1505 should not be used anymore! The international ISO 690 has replaced the German DIN 1505 some years ago. I have explained ISO690 here: <http://ISO690.ProfScholz.de>. That page originates from a journal I once worked for. So, do not get distracted by the layout of that web page.

All your sources (web pages, PDFs from the Internet) not archived need to get **archived with** <https://perma.cc> before they are referenced in the list of references. You will get a perma.cc account. Please watch for the automatic e-mail that informs you about your new perma.cc account. You will find a **folder named after your project or thesis title** into which you please store your results from perma.cc archiving. Details of how we write the list of references with the perma.cc links is given on <http://ArbeitenHinweise.ProfScholz.de>.

Before you hand in your report, you have to take care of the **final checks**: <https://www.fzt.haw-hamburg.de/pers/Scholz/ArbeitenHinweise.html#FinalChecks>. You find 63 items that you have to sign off individually in the list. Only in this systematic manner, we get a text that is (almost) free of formatting errors.

**Please keep in mind that scientific writing,
style and layout of your report account for 50% of the final mark.**

I need to put emphasis on this in marking; otherwise it tends not to be given sufficient priority by the students. Note: If your report looks bad, is unstructured, does not follow standards and traditions, it will not be looked at – no matter how good the content is.

What Gets Wrong Again and Again, but Should Not

Here are the points that often lead to "trouble":

- Paragraphs are separated (in German layout) by a blank line. To do this, you have to press return twice.
- It's normal: the list of references is a lot of work. The correct entry for each source must be carefully considered based on ISO 690. I must be able to find the sources (at best on the WWW). It is best to save the link immediately when you drag a document from the WWW or even better, to store the source on perma.cc.
- In US American English, the first letters of almost all words in a heading are capitalized, with the exception of articles, prepositions, and other similar "small words". Do this with help of <https://capitalizemytitle.com>. We use "Chicago" style.
- Tables have headings (above), pictures have a caption (below).
- We refer to a Chapter 2, Figure 3.1 or Equation (2.1) (capitalized first letter) in English writing, but the report consists of many chapters, figures and equations (small first letter).
- The first section is called "1 Introduction". Not: "1. Introduction". The point separates hierarchical levels (like in 2.1.3) and has nothing to do with "first".
- Variable names are usually written in italics.
- Formulas are written with the equation editor. A * has no place in equations as a multiplication point. Look up in good books, how equations are written.
- Please make use of all information provided, study and apply diligently².

²

Hier noch einmal für die deutschen Studierenden. Ich werde Ihren Text erst gar nicht hinsichtlich des Inhalts lesen, wenn er nicht ordentlich wissenschaftlich geschrieben und formatiert ist. Nutzen Sie die Informationen, die ich im WWW bereit gestellt habe. Es soll alles beachtet werden. Ich kann diese Dinge leider nicht jedem Studierenden einzeln erklären. Das passt nicht in meinen Zeitplan und das geben auch die Anrechnungszeiten für Projekte und Abschlussarbeiten für die Profs nicht her. Die gegebenen Texte müssen ausreichen dafür, dass Sie sich allein das wissenschaftliche Schreiben beibringen.

Summary

Start your work with a Systematic Literature Review (SLR). Work with my book, use the template, use the Word styles in the template, follow the hints in this memo and the details given on <http://ArbeitenHinweise.ProfScholz.de>. Understand the importance of the "List of References". Archive with <https://perma.cc> and write your references carefully according to <http://ISO690.ProfScholz.de>. Make use of Persistent Identifiers (DOI, URN, ...). Do not forget to perform the final checks of your text. This quick memo has included the links in the text and has no List of References. To that end, it is not representative of project or thesis writing.